THE LANCET.

The Introductory Anatomical Lectures delivered in London on the first of October, 1825.

We this week present our readers with the introductory addresses of all the anatomical lecturers of London, with the exception of those of Mr. Carpue and Mr. Mayo. The former of whom is not in the habit of delivering an introductory lecture, which, to use his own expression, he considers a *flash in the pan*; and the latter called at our office for the express purpose of stating that he objected to the publication of his lecture. We did not attempt to inquire into the grounds of Mr. Mayo's objection, but we are disposed to give him credit for having exercised a sound judgment. Posterity may, indeed, suffer from Mr. Mayo's resolution, but as cruelty to posterity is not yet made an offence by the humane Mr. Richard Martin, we know not how to avert the threatened calamity, if Mr. Mayo chooses to continue inexorable.

Mr. Mayo is a private lecturer, and he has a right therefore to exercise his own discretion with respect to the publication of a private lecture; but our friend Mr. Abernethy stands, we maintain, in a very different situation, and we have no scruple, therefore, in publishing *his* introductory lecture, in order to complete the series, even though he may on this, as on former occasions, be inclined to recalcitrate. As a Hospital lecturer, independently of the monopoly which he has procured for himself by the College Bye-law, he must abide by the consequences of his situation; we are anxious to bring this question to a fresh hearing; we are prepared to meet our friend, even though he should think fit to invade the retirement of Lord Eldon for a fresh injunction. Mild and gentle as we know Mr. Abernethy to be in all other respects, as a public Hospital lecturer we consider him as much *feræ naturæ* as the partridges which the Lord Chancellor, not having the fear of Richard Martin before his eyes, is now bagging at Encombe.

The order in which the lectures stand, has been adopted with a view to our convenience, and is by no means to be considered as a test of their respective merits.

MR. ABERNETHY.

Theatre of Anatomy, St. Bartholomew's Hospital.

It is the observation of a late writer, that if any person who had never seen a ship, or a palace, were to be shown the separated parts of either, and to have their uses well and accurately described to him, yet he would form but a very imperfect idea either of the ship or of the palace. Now, to obviate such an effect as I have alluded to, anatomists have been in the habit of devoting a few introductory lectures to taking a general survey of the body—of the whole body, before they proceed to the particular consideration of its parts; and I shall, on the present occasion, imagine the parts of the body to be separately and completely formed; and I shall, in idea, put them together, hoping by this means to show you their mutual connexions and dependancies.

To those gentlemen who are already acquainted with anatomy such an account will not be of much utility, and yet there is something in it: it is pleasing to observe the effects resulting from the action of many parts, and the harmony that is manifested among them in the performance of their several offices; and it also appears most proper thus to introduce the subject of the following lectures:—First, then, we may consider the bones, which are to be regarded as the walls of the building, and the pillars which support and sustain all the other parts. The body is composed of a pile of bones such as these, (pointing to a skeleton by his side,) the extremes of which are variously formed, and evidently fitted to admit of a variety of motions; but the surface of bones being rough, they are not calculated to slide on one another, as is necessary in the performance of our several motions, and, therefore, the articulating surfaces are covered with a very smoothly-polished substance called cartilage, or gristle; these surfaces are continually lubricated by a very slippery mucilaginous fluid named synovia, called vulgarly joint oil; and the escape of this fluid from the joint is prevented by a membrane-like band, called capsular ligament, and the bones are also firmly fixed together at their articulations by strong bands of unyielding ligament—bands so arranged as freely to permit all those motions which the joint is constructed to al-

low of, and so as to prevent any other. So great is the strength of these ligaments, that on the application of a force tending to separate the bones from them, the bones will sometimes break, and the ligaments remain entire. Now, such is the mechanism of a joint, by which we possess equal security and facility of motion. Nature has moreover wisely endowed these parts with so small a degree of sensibility, that notwithstanding the violent pressure and rapid motions which their offices oblige them to sustain and undergo, we are really scarcely sensible of the part at which such motion is effected. Thus we see a machine excellently calculated to admit of a variety of motions; but the bones are incapable of moving themselves, and hence arises the necessity for moving powers, or muscles: these consist of soft fibres, which have the power of shortening themselves with great force; and, indeed, it is wonderful that a bundle of such fibres, which would be torn asunder in the dead body by the weight of a few ounces appended to it, shall, in a living state, be capable of lifting up and sustaining more than one hundred pounds. The manner in which this contraction is produced, has been eagerly sought for by physiologists. The accounts of all those who formerly attempted to solve the phenomenon are reducible to one principle: they supposed the fibres were tubes into which a fluid was projected, so as that, on the extension of the tube, its length became shortened; but such conjectures are at once refuted by considering that the power impelling the fluid must be very great to produce so forcible a contraction, and this impelling power can no where be discovered. This hypothesis was formed at a time when the laws and principles of mechanics were supposed to be adequate to account for all the phenomena of nature, and before the effect produced by electricity and magnetism was regarded with that accurate and extensive observation which it has since obtained. Whether we examine an animate body, or those which are inanimate, we observe the material—we observe that it is sometimes gradually changing its form and its quality, while at other times we perceive it moving with surprising rapidity and force, and the primary cause of motion of matter is in every instance equally difficult of scrutiny. We know nothing of matter but the properties which the different species of it possess. Of that matter which, for the most part, presents itself to our notice, which is cognizable to the eye and touch, we know that it has a property called by Sir Isaac Newton "inertness"—an indisposition to move unless impelled to motion, and a disposition to continue in motion unless retarded. But there are other kinds of subtle matter in the nerves, such, for instance, as electricity and magnetism, the motion of which does not seem to be regulated by the same laws, and which are not in general cognizable to the eye or touch, but of the existence of which reason furnishes us with the most indisputable testimony. Now these kinds of subtle matter, we know, frequently act upon and put in motion that which is gross and inert; we see magnetism move very ponderous pieces of iron, and electricity displace and dissever the most stable substances which oppose its passage. The late experiments of Sir Humphrey Davy have thrown much light on this subject: he has shown that it is electricity, working silently and slowly, which produces all the alterations we perceive in the composition of surrounding bodies; and he has also found additional reasons for believing that it can likewise produce sudden and forcible motions in the largest masses of matter; that it is electricity acting in, on, or over the surface of the earth, which causes the whirlwind, the water-spout, and those concussions of the air called thunder; that it is electricity which, with its sharp and sulphurous blast, fells the venerable and "knarled oak," and destroys our most stately edifices; that it is electricity, acting beneath the surface of the earth, which causes the still more tremendous concussions, earthquakes, and which throws up subterraneous matter from volcanoes! Now, are we not warranted to believe that some chemical agent produces the effect on organized bodies which we find continually taking place elsewhere? Is it not admissible to believe that a similar agent produces the sudden and forcible motion of matter which forms the striking characteristic of living beings? Do we indeed depart from the laws of reason, in supposing that electricity, or some corresponding principle, is the prime moving cause of vital action, without which, as Mr. Hunter has indisputably shown, it is impossible to account for the functions and processes of life? Reflecting modern physiologists do not, I believe, entertain a doubt that a certain species of matter pervades living bodies, and is the cause of motion and of the phenomena observed in them. It is not likely that the visible fabric of a muscle (the main flesh and fibres of which are readily lacerable, even in the living body, when they are in a state of inaction, and which have all the properties belonging to common matter) should have that wonderful one superadded, of contracting with that celerity and force which characterizes the animal action. I cannot lay before you, at present, all the physiological arguments which have been ad-

duced by many (I may say, by most) to lead to the belief that it is the effect of a distinct species of matter; they are so numerous and cogent as to enforce (and I may say, establish) the opinion. Although many sensible and reflecting men, from the earliest ages, have thought on the subject as we now do, yet the credit of fairly, boldly, and clearly teaching this doctrine is due to the late Mr. Hunter, whose opinion on this subject has gradually gained ground, and become generally established.

It appears that in an animal body, according to the number of muscular fibres, so is the force which is connected with it, or which the muscles possess; but so great a number of fibres could not be fixed to one point of the bone destined to be moved, and Nature has contrived to attach them to a great cord, called a sinew or tendon, which is the same as if they were all attached to the bone: thus, if I were desirous of moving a very heavy table, and I had one hundred men to effect my purpose, I would not say, "Take hold of the table," because there would be no room; but I would tie a strong cord around the table, so that each should pull at the cord, and thus a similar effect would be produced. You will find that there are numerous contrivances in the body for fixing a great number of fibres, so as to operate on one tendon. The sinews possess great strength, and great force is required to rupture them, and yet they will sooner tear than the acting muscular fibres, which act with prodigious force, and always in proportion to the cause requiring its exertion. It is interesting to reflect on this circumstance—the bones are sufficiently strong for all the purposes of life; the ligaments which tie them together, and the sinews by which they are moved, are still stronger, and yet the muscular fibres are less likely to be torn by violence than either. We shall find that if any part of our body be destroyed, it is never perfectly reproduced; but bones can be united by cartilage and ligament, each capable of supplying the place of the destroyed part; but the muscular fibres are less capable of regeneration. The intention of Nature seems to be the preservation of the more important part in these laws. The matters which compose our body are sufficiently strong for all the purposes of life, and yet the acting parts are still stronger, and are capable, under circumstances of great exertion, of rending asunder the bones and ligaments which compose the human frame.

You have now, then, surveyed the machine as adapted for motion; it appears calculated for its performance; but how, you will ask, are these parts originally formed, or how do they continually exist, for the matter of which they are all composed is not of a permanent nature, but continually tending to its own dissolution? How, then, when the old parts batter and decay, are new ones supplied? It is from the blood the body is nourished—all the nutritious principles are contained in this vital fluid, and here arises the necessity for vessels to distribute this fluid to every part of the body. The blood is propelled by the heart, in tubes called arteries, to every part, from whence it is returned through other tubes called veins. The heart is a hollow muscle, in which quality it receives the returning blood, and by its contraction returns it again to every part of the body for nourishment; thus maintaining a circulating course, which was first discovered by Dr. Harvey. We have considered the materials of a body as prone to decay; and when they have undergone such an exchange, we may next inquire what becomes of them. We shall find they are removed by a set of very fine vessels, called absorbing vessels, which exist in great numbers in every part, although, from their minuteness and transparency, they are difficult to demonstrate. If from the blood the body is nourished, from whence, you may ask, is the blood supplied? It is formed chiefly from our food; and hence arises the necessity of organs capable of converting our food into blood, and assimilating it to the nature of our body. The alimentary regions are allowed to animals for this purpose, the use of which are to have the power of converting vegetable and animal, and apparently very dissimilar called chyle, which resembles blood very much in its nature, but differing in its colour, it being like that of milk; chyle, thus formed, derived from the food, is conveyed into the veins, where it soon acquires substances, into the same kind of fluid, the red colour and other properties of blood. As, however, many useless, and probably some unsalutary particles of matter are taken into the blood with the chyle, the absorbing vessels are continually removing the old matters of our body, and transferring them into the blood vessels. We may next inquire, how such useless and noxious matter is separated from the same? We know it is by the urine, by perspiration, and from the lungs; but to explain this circumstance, it is necessary that we should take a more minute and accurate survey of the circulation. We know that the body is nourished from the blood, and various fluids prepared from it for purposes essential to the animal economy, as the saliva, tears, and gall. We find that the blood flows with great rapidity through the larger vessels; but on its arrival

at the smaller ones the velocity is checked, owing to circumstances which will hereafter be explained to you. Now, the slow course of the blood in the small vessels is probably favourable to the preparation of the nutritive materials for the repair and growth of the body, and also to the dissimilar liquors and substances which are said to be separated or secreted from it, from whence, by its rapid course in the larger vessels, the blood is conveyed pure and unadulterated to all the parts of the body for their nourishment. Suppose, then, the blood to be slowly moving in the minute arteries from the small tubes, the proceeding which separates the different fluids from the secreted blood takes effect, while the minute arteries containing the blood from whence the separation has been made, become reflected towards the heart, and transferred into a vein, through which it returns the remaining blood. But as, from the languid motion of the blood in small vessels, some changes of its quality takes place, (and it is certain that it has lost its colour and acquires a dark purple hue,) some change appears necessary to fit it again for the nourishment and support of the body; now, for this purpose, it is propelled from the heart, by the heart, through the lungs, where much carbonaceous matter is thrown off from it, and it becomes exposed to the action of the atmosphere, the medium of the containing vessels alone intervening; great changes are, by these means, produced, for it returns from the lungs to the heart again of a bright scarlet colour, and fit to be distributed for the support of every part of the body.

Now all those parts which I have mentioned, are enveloped in an elastic and spongy substance; the bones, the muscles, the blood-vessels, and the bowels, are all connected by a cellular substance, which, from its elasticity, yields to the performance of the several motions; and when they cease, by its elasticity it returns the parts to their former situation. In some of the cells of this substance the fat is deposited, which seems to be a very nutritive matter; and wherever nutritious particles abound, they are laid up in these cells as in a store-house, from which, when wanted, they can be drawn. These cellular substances being condensed on the surface of the body into a compact state, form the skin, which serves to defend the other parts, and to give a smoothness and a regularity to the surface of the body.

Now hitherto I have been describing a body as adapted for motion and capable of existence, but without sense or feeling, and we have yet to inquire by what means we obtain a knowledge of the surrounding objects, and are able to direct the various motions of our bodies. The possession of this faculty is owing to the brain and nerves. The brain is a substance situated in the bony cavity of the skull, and the nerves, which are of a fibrous texture, appear like a continuation of the same substance through every part of the body. It is by means of the nerves that intimation is received of the property of surrounding bodies, which conveys its will to the muscles. Thus, if I will to take up this book, the determination is conveyed by the nerves of my arm to the muscles, which immediately perform it—it is moved—I ascertain its shape and other properties, the intimations of which are conveyed by the nerves to the brain; for if the nerves of my arm were cut or tied, the muscles, although they would still possess—although the muscles would still possess the power of motion, I could not by my will influence them to act; or if my finger was applied to the book by another person, the nerves would convey no intimation to my brain by which I could distinguish its quality. Now the manner in which sensation is produced in the brain from every part of the body, and in wh ch volition is conveyed to the muscles by means of the nerves, can be but little known. Many ingenious men have in vain attempted to explain it. All they have been able to show is, that an object causing a sensation, produces an impression in a part of a nerve remote from the brain, which is propagated by the nerve to that organ. It is, however, a discovery in modern physiology, that sensation is not produced merely in consequence of the impression being made on the nerves, but that action in the nerve must be excited, which action is propagated along the fluid; and this discovery explains why we very often experience every sensation from infancy, when we are very often unaffected by impulses that are most forcible; for it is not the impulse, but the action which is excited, which is propagated to the brain, and occasions feeling. In accounting for sensation, we are compelled to believe that there exists in the muscles as in the nerves, as well in the nerves as in the muscles, a subtle matter, which acts spontaneously whenever excited by external impressions or internal volition. It does not appear that there is a substantial difference in the construction of the nerves themselves, for, when injured, they all alike convey the same painful sensation. Therefore, why we see so well, appears to arise from the circumstance that the nerve is protected from the touch of grosser bodies, and light has only access to it, and induces the action which occasions us to see places from

which it has emanated, or been reflected. In like manner, the auditory nerve is so sheltered from the touch of gross matter; but it is accessible to the vibration produced by sound, which excites the action which gives us hearing. All that is effected in any instance, is the excitement and propagation of motion to the brain; and although it is probable that the internal organization of the brain contributes to produce varieties of feelings and affections, yet such varieties can only be attributed to the wonderful properties of which the parts are composed. And this is a subject that I think cannot fail to astonish every reflecting person. As, however, the functions of the nervous system form a very curious and interesting subject, allow me to consider them a little more extensively. There is a power of accommodation in the nerves to the circumstances in which they are placed. A man, for instance, confined in a dark place shall receive an impression adequate to produce sight from a very small quantity of light, and his eye will be injured by the common daylight; the reverse of this is equally true: a person may remain in a strong light, and his eye become so inured to it, that the ordinary quantity shall fail to produce a proper impression; or a person who has been long in still and silent places shall hear the slightest sound, which shall be imperceptible to another whose ears were accustomed to the force of vibrations made by loudly-sounding bodies. Habit, also, has some effect in contributing to this power of accommodation of the nerves to the circumstances in which they are placed. A ring, when first worn on the finger, is constantly felt and attended to; but, afterwards, the nerves cease to act, from being accustomed to the pressure; they also act so as to excite feeling and attention on its removal. These powers of accommodation do not belong to particular senses, but have a more general influence: a person living a luxurious life, who shuns every sensation that gives him the least uneasiness, who attends merely to the gratification of his pleasures, renders his nervous system in general too sensible; — he shrinks from the cold winds, he is startled by a little noise, and every rough impression, which would not disquiet another, owing to his ill-judged indulgence, distresses him. Now let us remark the contrast in a hearty seaman who has endured the inclemencies of the weather, and has sustained fatigue and pain: he feels the wind blow, and hears the cannon thunder, but neither affects him much; and from being inured to sensations at first painful, he is at last unaffected even by those impressions which would hurt a man living in a medium between the two extremes.

The nervous system not only serves to inform us of the properties of surrounding objects by means of the organs of sense, but also to guard us against the application of any thing hurtful, as monitors teaching us to avoid it. Thus pain is very useful to us; but although from the nerves we occasionally suffer pain, yet, in general, they are the source of pleasure by means of our senses. Let us suppose an animal in a state of nature and health. Is not his eye delighted by beautiful prospects, and his ear charmed with melody—is he not regaled by the odours of herbs and plants? Does not his every want contribute to his gratification—the want of nourishment occasions hunger—fatigue requires rest; and where are there greater animal pleasures than in the gratification of such wants? Such is the state of an animal formed for enjoyment; but to this corporeal state man has added and affixed reason, which ought to furnish him with the greatest source of pleasure, if the intention of nature were not perverted. Finding gratification proceed from the satisfaction of his wants, he has absurdly increased their number in order to increase his enjoyment. For all natural wants nature has amply provided; but these fictitious wants cannot be gratified, and therefore he has made to himself a source of disquiet and discontent.

There is another subject on which I wish for a few minutes to engage your attention, as I think it cannot fail to interesteven those who have not been much engaged in physiological researches—I mean the connexion of animal motion with sensation. We naturally are influenced in our reason by our feelings; and, knowing that, we shrink from whatever gives us pain; we infer that the involuntary motion of animals arises from the same cause; yet, if the subject be attentively considered, I have no doubt that this opinion will be found to be erroneous. If a man's leg be amputated, and stimulated some hours afterwards by electricity, excited in the manner which Volta first explained, a rapid motion of the muscles will take place; but can we believe that this limb has sensation, or could we persuade the person from whose body it has been removed to be of that opinion? Surely not, for he will feel no pain when the limb is excited after it; on the contrary, he may feel pain when it is not—nay, people actually feel pains in their limbs—pain and sensation in their limbs when they are destroyed by putrefaction, which shows, if I may so express it, the totality of essential principle remaining in the brain. If any thing be proved in physio-

logy, it is that the essential principle is connected with the brain, yet motion takes place in parts unconnected with that organ; even vegetables, and the lower kinds of animals, possess powers of motion, but it requires that the mind should be in some degree prejudiced before we can believe such motion to be the result of feeling! Assuredly, motion does not necessarily imply sensation; we see rapid and powerful motion of matter taking place around us, in cases where no physiologist ever dreamt that they arose in consequence of sensation.

Now my time does not allow me to recite all the arguments in proof of this opinion, that the action of animals takes place independently of sensation; but this, I believe, will be found to be clear in such a mysterious subject, that the faculty of sensation resides in the brain of man, and that the motions arising in the nerves, in consequence of impressions made on them, are propagated to the brain, and give us all that knowledge we possess of surrounding bodies; whence other motion, excited by volition, are continued in the contrary direction through the nerves, and enable us to regulate the actions of our muscles so as to operate upon the objects which surround us.

The conclusion to be drawn from this summary survey of the animal powers is interesting; for we perceive so exact a correspondence between those opinions which result from physiological research, and those which arise so naturally from the suggestions of reason, that some persons have considered them as innate or intuitive. Most reflecting persons have, in all ages of the world, believed, what it is indeed natural to believe, and what physiology also teaches us, that there exists in the human body an assemblage of organs formed of common and inert matter, such as we see any where—a principle of life and action—an essential and rational property all connected, and yet each apparently distinct from the other.

Thus, gentlemen, have I, for the reasons stated in the beginning, endeavoured to present you with an imperfect sketch of the structure of the human body. Custom has made introductory lectures in some degree necessary, and I know not how I could better employ the time allotted to this purpose.

Now the *business* of the course will be properly arranged under three heads: the first is the *demonstrative*, in which the situation and the structure of the parts will be explained and shown. This is the most laborious part of the course, but it most particularly requires your attention. Physiology, or the reasoning on the animal functions, may be learnt from books; but no books can convey to you a true idea of the shape and structure of the different parts of the body; they are so various in their organization, and so multiform in their appearance, that the true motion of them can only be acquired by the sight. I may add, that it is absolutely requisite that this part of the course should be clearly known, or the succeeding divisions of it cannot be understood.

The second part of the course is physiological, in which the functions of the organs, the mode by which they perform their various offices, will be considered. The student will now be amply repaid for whatever pains he may have bestowed on acquiring a knowledge of the structure of the human body, for there is not in the whole circle of science any knowledge that brings with it so much gratification to the mind as that of the physiology of the body. While other sciences carry us abroad in search of foreign objects, in this we are engaged at home, and on concerns truly interesting—in inquiring into the means by which we "live and move, and have our being." By such considerations we are most likely to form a just estimate of our own powers and consequence in the creation, and to acquire that difficult and important information, a knowledge of ourselves. But if physiology be thus engaging and instructive to the philosopher, how much more so must it be to a person employed in the practice of medicine, for he knows that it is the only way by which he can arrive at the knowledge of the nature and cure of diseases, since it is evident that the remedy for the disordered functions of the body cannot be perceived unless their natural and healthy functions be previously understood. Physiological researches are the chief means to preserve health, the most valuable of human blessings, and to prevent disease. In truth, then, I think we may say, for all these reasons, with the poet, that

"The proper study of mankind is man."

Now the third part of the course is *pathological*, in which diseases are treated of; but this subject is too extensive to be considered in general, and therefore I confine myself, as you will see by the proposals, to such diseases as produce an alteration in the structure of bodies. The nature and treatment of injuries, which befal the bones and joints, will be dwelt on. As this subject will be most clearly understood, it will make the strongest impression on the mind, while the form of the bones, and the mechanism of the joints, are before our eyes. The operations of surgery will also be shown on dead bodies: the changes that likewise occur in the uterine regions of females during the period in which propagation is taking place,

will also be a subject of inquiry and demonstration. In short, gentlemen, it is the structure, the functions of the body, the state and length of disease under the varying circumstances which take place at different periods of time, that are the subjects on which I pledge myself to instruct you, as far as my ability will permit me.

Gentlemen, I think it necessary to detain you for a few minutes longer, for I have been accustomed annually to read a part of what I said when this theatre was first opened, as it may tend to keep alive, in the public mind, the consideration of the nature and the exigencies of medical science. Speaking of Hospitals, I observed, "Unquestionably Hospitals are the best schools of medical instruction, for in them we have the patients' conduct under control, and can regulate and closely trace the progress of disease to its cessation or fatal termination. In general, also, in the latter case, we have an opportunity of examining the exact nature of the disease, and learning whether our opinion, from the treatment of it, has been correct or otherwise. Facts are thus accumulated, and the general subject of medical knowledg eaugmented. In hospitals likewise, students, after having learnt the scientific principles of their profession, have the opportunity of seeing them practically applied; the precept and the example are both before them, and respectively impress each other on the memory. It is to little purpose to teach separately the multitudinous facts appertaining to the structure of the parts of the human body, or repeat the numerous observations and experiments which have been made relative to their functions, for the knowledge thus communicated will necessarily be acquired with great labour by the pupil, and will, perhaps, be soon forgotten, or recollected with difficulty. It is only by contrasting the healthy form and appearance of the parts of the body with the mutilations effected by accident and disease, and the healthy with the disordered functions, showing the rational means of cure, that anatomy and physiology can be regarded as so highly interesting and important, as to impress indelibly on the memory what we have learnt, and excite us earnestly to desire an increase of knowledge. In hospitals, also, students learn, from the comparison of the numerous cases presented simultaneously to their observation, to discern those minute particulars which distinguish diseases from each other; for many maladies, apparently similar, are very different in their nature, so that they may be compared with the common herbage of the field, in which, under a general remblance, we find plants of very different qualities, some salutary, and others the reverse. In short, the practical knowledge of our profession is much more readily obtained in hospitals than it can be any where else; and all the information which is thus acquired, is disseminated, by means of the student, throughout society. When a school of medical instruction is connected with the practice of an hospital, we are also able to select students of whose zeal, capacity, industry, and devotion to study we are assured, in order to render that subordinate assistance to patients which is necessary for a proper management of their cases. I am much gratified to be able to declare, that I know of no situation in life in which patients receive, in general, such good subordinate attendance as they meet with in these establishments; for I have constantly observed, that the real students of their profession are highly interested in the well-doing of the cases that are in part confided to their management; they live almost wholly on the spot, and are ready at all times to re-adjust dressings, which the irritableness of the patient may displace; and they will often perform very menial and disgusting offices for the accommodation and comfort of those confided to their care.

Now, in other countries, Hospitals have been founded and supported by the Government with a view of their becoming schools of medical instruction, to supply the army and public service with capable professional characters, rather than for the purpose of humanely relieving the sufferings of the sick and injured poor; yet, whatever motives may have led to the establishment of Hospitals in other countries, their utility as schools of medical science is, in every instance, deemed of principal importance. In proof of this, I may mention that no one can receive an appointment to practise in an Hospital abroad who has not given public proof of his proficiency, zeal, and superior ability, and who is not qualified to become a teacher of his profession. Students of promise are sent abroad at the public charge to improve themselves in other countries, and on their return receive appointments to Hospitals of their own. Those who are learning the profession are not suffered to officiate as dressers, until they have shown their professional ability by public examination; records of interesting cases are expected to be kept, and dissections of such as have terminated fatally to be correctly registered. In this country, however, where Hospitals have been chiefly founded and supported in consequence of the benevolent feelings of the public, the more immediate and the more interesting objects of relieving the sufferings of the sick and injured poor

have so entirely engrossed the attention of the Directors, that their utility as schools of medical science have been but little considered. It is true, indeed, that the medical men have by degrees converted the Hospitals of this country into schools of medical instruction, but then this has been often done in opposition to the wishes of the benevolent Directors of the charities.

I know of no instance, except at this Hospital, (and this was said when there were Governors here,) in which the Governors of an Hospital have, of their own accord, established and patronized a school of medical instruction in connexion with the practice of the Hospital. Surely this act must be considered honourable to the Governors, because it shows that they have taken enlarged views of the benefit which these instructions are adapted to confer on society; it claims my especial gratitude; and I am convinced that the students will ever participate in my feelings, and show by their conduct, with respect to the patients, that they are not undeserving of that patronage for which they are themselves so highly indebted.

After having adverted to this memorable and almost solitary instance of public patronage being bestowed on medical education in this country, I cannot but express my deep regret that the public in general are not more attentive to the nature and wants of medical science, in which however they are virtually interested. This inattention would be the less deplorable if ignorance, indeed, were merely a negative quality; if, failing to do right, it forbore to do wrong; but it is most mischievously active, and greatly augments "the various ills which flesh is heir to." Those who have studied the profession as a science must always be the observant and respectful followers of Nature; they never presume to precede her, except to remove some impediment from her path, or to perform what she evidently indicates; but the ignorant take the lead—place obstacles in the way of Nature's progress, and presume to direct her course. So admirably are we constituted, that the very actions of disease often tend to the restoration of health; yet these beneficial actions, by the ignorant, are deemed diseases, and are put a stop to, and a far much worse malady in consequence established. Trifling diseases are suspended, we may call it cured, by means destructive of health and productive of lingering infirmities. Oh! of the mischiefs of quackery I could say much!—(*Laughing.*)

Now, in other countries, the means of promoting medical knowledge, and preventing the mischievous effects of ignorance, have been studied and practised by the Government, which has, consequently, with special care, provided means for teaching anatomy, for this is the only basis upon which the superstructure of medical science can be built. We must understand the healthy structure and functions of the various organs and parts of the body, or we can never understand the nature of the diseases, nor the rational mode of effecting their cure. How absurd would be the conduct of a mechanic, whose business was to rectify the errors of a complex machine, were he merely to provide himself with the fit tools for the purpose, without possessing the knowledge of the structure of the machine, by which means alone he can be able to discover the cause of the error, or the stoppages of the different parts, and, consequently, the knowledge of what is to be done to render it again perfect or useful; yet equally absurd would be the conduct of medical men, should they study botany, chemistry, natural philosophy,—searching, indeed, through all the paths of Nature, and science and art, for the means of cure, and yet neglect *anatomy*, by which alone they can distinguish the nature of the difference between health and disease, and, consequently, what is necessary to reconvert the latter into the former, and which is the only thing that can render medicine a science!

All foreigners express actual astonishment, that the teachers of anatomy are obliged in this country to depend for the power of communicating this most necessary and important knowledge on a precarious supply of bodies, which have been suffered to become putrid, and, afterwards, have been interred. This is indeed a national disgrace; and, formerly, I would not willingly have acknowledged the fact of the disinterment of bodies, because it tends to disquiet the best feelings of the public. The newspaper writers have now so blazoned it forth, as to render any attempt to conceal it unavailing; still I would beseech these worthy gentlemen, and, indeed, the magistrates in general, to consider, first, the necessity of the case, and, secondly, that the act is uninjurious if unknown.

It only becomes injurious in consequence of its promulgation, and therefore its detection ought as much as possible to be suppressed. I know the necessity of the case became a subject of deep interest and consideration to men of the first intellect, knowledge, and rank in this kingdom. It was not long after the commencement of the last war that the detection and trumpeting forth of an offence of the nature I have alluded to, induced a Member of Parliament to move for a bill to make it felony the stealing of a body; I, with others of the profession, stated to

those in power, that there were at that time, probably, two hundred young men who came annually up to London to obtain a stock of anatomical knowledge which was to last them for their lives, and that at the conclusion of the season these students were employed in the army and navy, where their services were greatly wanted; I begged those with whom we had the honour of conversing to reflect on the consequences of sending forth these young men in ignorance to torment and increase the sufferings of their valiant countrymen. Now every conversation ended with this decision, that the study of anatomy is indispensable, and must not be prevented. There are unhappily in this, and in all other countries, numbers who die without relatives, or friends to mourn their loss; if, then, the superintendants of prisons, poor-houses, and eleemosynary establishments, would but consent that the remains of those who die under such circumstances, or remain unclaimed, should be made the subjects of anatomical instruction, we should then be put on the same footing with other nations, and this obnoxious system of disinterring the dead would be no longer necessary. The thing is perfectly easy to be done; in other countries the police can direct that to be done which is contributory to the public good, although contrary to the feelings and will of the parties immediately concerned, who, however, readily and easily acquiesce in what they know to be inevitable, and what custom has established.

In no place could the prejudices against dissection be more strong than they were at a certain period of time in Paris. I could tell you many instances of it. Haller was obliged to set off as hard as he could for fear of apprehension; yet, at present, the bodies of those who die destitute are brought sewed up in matting to the different anatomical schools, and when dissected, are returned in the same manner for interment, without exciting any disturbance, or even the attention of the public mind. In this country, however, the police can interfere no further than with a view to prevent or punish the infraction of established laws, so that the correction of the errors and abuses which I have been lamenting rests entirely with the public. Now, on the good sense of the British public I place the greatest possible reliance; but it is extremely difficult to induce the public to attend to subjects in which they do not feel an immediate personal interest, or to engage them in the calm consideration of any subject when they are disturbed by their feelings and their prejudices. I have been advised to say this, that it might keep alive the subject; it is a most deplorable thing, and I trust the good sense of the public will eventually see the subject as it has appeared to the Governments abroad, and indeed to people of other nations, and that anatomists will be put on a better footing; that the teachers of anatomy may be put on a better footing than hitherto they have been; as it is, we must do as well as we can.

MR. ROOKES.

Theatre of Anatomy, Blenheim Street.

GENTLEMEN,

I HAVE now the honour of commencing my autumnal course of Lectures on Anatomy, which will be preceded this day by a discourse introductory to the science we profess to teach.

It is with diffidence I beg leave to address you on a subject abstruse in itself, and rendered still more difficult from the popular prejudices which, even in these enlightened times, exist in the minds of many whom we should expect to find more liberal.

I hope to avoid all imputation of vanity, if I consider the science of anatomy as one which immediately interests the welfare of the human race. Even in the most early ages, before luxury had laid the basis of many diseases, now too frequently experienced, and in countries even remote from the influence of civilization, the knowledge of anatomy must have been considered of the very first importance, inasmuch as self-preservation is found to operate in the human breast over every other principle.

That science, therefore, which enables us to afford relief to our afflicted fellow-creatures, in cases of the most imminent danger, must surely be considered as one of the first of all human acquirements. The subduing warrior, proud with conquest, would soon return to the humble dust, without the assistance of the anatomist, when labouring under a dangerous hæmorrhage, or an oppressed brain; accidents which are incident to all mankind, whether in polite or barbarous nations. The magnificent palace and the bed of down would oftentimes afford even more short-lived joys than the homely cot, without the succour of the Æsculapian art, the basis of which is anatomy.

All human possessions and endowments avail but little without health; the means of preserving which, and of averting death, must, in numberless instances, be attributed to the Medical Practitioner.

Thus far then, Gentlemen, have I, in the most cursory manner, touched on the indispensable necessity of an unremitting attention to the structure of the human body; which is universally considered by all sects as the chef-d'œuvre, the masterpiece of the Almighty. (And such as, when blessed with a virtuous mind, gratified the Omnipotent Creator, more than all his other divine and incomprehensible works.)

This word anatomy, in Greek ἀνατομη, from ἀνα and τεμνω, disseco, originally imports no more than the cutting, or dividing any body by a sharp instrument; but now it is only applied to signify that practical science, which consists in artfully dividing animal bodies into their constituent parts; to the end, that we may discover their several situations, connexions, and manners of acting. As the ancients never suspected there were any organized bodies, except animals, they confined this term to the dissecting of *animal bodies*. Later observations, however, have discovered that vegetables are endowed with organs, as well disposed, and as regularly fitted for the purposes of nutrition and generation as animals; therefore you will find some using the term anatomy in describing the structure of plants, but never without annexing the explanatory epithet of the subject of which it treats, as Anatomia Plantarum, Rhizotomia, &c. Hence, whenever it is mentioned alone, we are always to understand the dissection of animal bodies, and particularly of the human body.

To prosecute this science in a regular way, it behoves us to begin, as has been customary with the professors thereof, with the history of Anatomy, taking a gradual view of its rise and progress in the different ages of the world; also of those ancient anatomists who have been remarkable for their discoveries, and have laboured to prosecute or diffuse the knowledge of their art: however, we shall confine ourselves chiefly to the *outline* of this subject, referring those gentlemen, who would wish to be more particularly acquainted with the history of this science, to such works as have been expressly written concerning it.

And I would beg leave to recommend the Bibliotheca Anatomica of the late Baron Haller, or a work of this kind published in France in 1770, by M. Portal, in seven volumes duodecimo, entitled Histoire de L'Anatomie et de la Chirurgie, as the best publications to be consulted for obtaining this knowledge.

As the antiquity of a science is a presumption of its importance, teachers generally endeavour to trace the rise of that which they profess as far back as possible: pointing out every circumstance that may have contributed to its first introduction, or subsequent improvement; although it must be confessed such inquiries are in general of little use, and afford but small entertainment from the extreme uncertainty attending them, and from the distance of time at which they are placed.

But we are not in anatomy, as in tracing the origin of the other sciences, allowed to indulge in conjecture, for we are tied down by the sacred writings, which expressly tell us, that the sons of our first parents offered up sacrifices of animals long before animal food was permitted; in which, as well as in butchering, when animal food was granted to Noah,* by divine permission, a regular division of parts became necessary. Some parts were reckoned impure, and set aside, while others were reckoned more proper for the solemnity intended, and other parts were allotted to the sacrificers.

In the slaughter likewise of the larger animals, a division, to a certain degree, was requisite, and when the world came to be more peopled, jealousy, avarice, and ambition embroiled mankind in wars; for we read very early of battles, where the interior parts of the body would be more frequently brought into view than they are at present, from their use of large coarse-cutting weapons. When men came to be further protected by laws, ease and security induced them to consider many things they had not thought of before; so that they endeavoured to preserve the bodies of those after death who had been distinguished in life. This practice was familiar to the Egyptians in the days of Joseph;† and, from the term Mummy, it has been supposed to come from the Persian, Mum in that language signifying wax, which substance is said to have been much used in preparing Egyptian mummies; but from their art no such accurate knowledge of anatomy could be obtained, as some have imagined; for if you look into Herodotus, who has written on this subject, you will find that the operators were obliged to extract the bowels piecemeal, to prevent the body being maimed; this, however, with the inspection of wounds, must have convinced mankind of the analogy existing between the structure of the human body and that of quadrupeds.

At length we find the priesthood, equally ambitious of acquiring power and ingenious in contriving the means of obtaining it pretending that future events were revealed by certain signs and tokens; and

* Born 2948 B. C.

† Died 1635 B. C.

that they were more especially discoverable in the bowels of such animals as were opened for sacrifice; the credulity of men keeping pace with the imposture, nothing of importance was undertaken without consulting the augurs: this too was begun in the eastern nations, and took place among the Romans from the building of Rome. Little addition indeed could be made to the knowledge of anatomy, from this practice, for nothing was done accurately: thus if you read Livy,* who takes particular notice of this custom, in one instance the heart is said to have been wanting, while in another two hearts are said to have been found; so that the whole was a mere illusion: a few only of the bowels were examined, yet these are perhaps all, or at least the chief means that for many ages introduced or improved the knowledge of anatomy, for we do not find in the sacred writings, nor in the books of Homer, or Herodotus,† that anatomy was considered as a science of use or entertainment, nor are the sons of Æsculapius celebrated for their knowledge in this art, but for their skill in the virtues of herbs. At length the curiosity of the Grecian physicians seems to have paved the way for the further improvement of anatomical knowledge, by admitting it into their studies, as one of the branches of natural philosophy.

Thales, Democritus, Empedocles,‡ &c. are celebrated for their improvements in anatomy, and specimens of their skill are found quoted in different authors. But we are chiefly indebted to Hippocrates, who first not only separated medicine, as a distinct science and profession, from the study of philosophy, but seems to have considered anatomy as especially and immediately subservient to physic and surgery.

The degree in which the skill of Hippocrates ought to be placed has been matter of great dispute; some pretending to find in him all that is useful, while others depreciate his skill in the opposite extreme; the best and most impartial judges of the merits of Hippocrates own, that they discover in his works a general knowledge and application of anatomy: but this is extremely superficial, and in some circumstances highly erroneous; *e. g.* he every where confounds the arteries with the veins, not only using the same term (φλεψ) to express both, but considering both as branches of the same root.—In like manner he confounds the nerves with the tendons, applying the same name to both organs (τενοντα) but so far is he from having the least idea of the offices of the organs we now call nerves, that he ascribes them to the blood vessels; nay further, we do not find in any of the works which are allowed to be his,* by the more accurate critics, or are proved to have been written in the 5th century before the Christian æra, that any dissection was made of the human body; for the proof thereof given us by Baron Haller, viz. that he describes the subclavian muscle, is by no means sufficient, because that muscle is found in the ape, the common anatomical martyr of that age and country, (and indeed in every animal that has a clavicle;) soon after that period, however, in other works generally published, as belonging to Hippocrates, there are evident proofs of the human body being dissected, for we find the exact number of the lobes of the lungs, and of the vertebræ, and there is a tolerably just parallel between the chylopoietic viscera of a man and a dog.

The admirers of Hippocrates, not content with ascribing to him sufficient knowledge of the human body, have pretended that he knew much of the animal economy, and especially that he understood the circulation of the blood; but we shall consider this matter afterwards. When we come to treat of the real period when that discovery was made, I shall succinctly state as much as was known in former ages on this subject. In the following centuries, the third and fourth before the birth of Christ, we find anatomy still cultivated by the philosophers. Plato reasons with considerable ingenuity with regard to this science; and Aristotle, his contemporary, who lived in the century after Hippocrates, not only reasons from the descriptions of others, but undertakes a natural history of the figure and structure of animals, in which pursuit he was engaged by Alexander the Great; and we are told by Pliny, that Aristotle completed this undertaking in fifty books, or volumes, of which eleven only are now extant.

Unluckily those which treat more immediately on the dissection of animals are lost, but in those which remain we find numerous remarks of considerable skill, and he seems to be the first who assisted his descriptions by figures, a discovery of unspeakable use, which, however, was so much overlooked, that when it was revived near an hundred years afterwards, it was considered as a new invention. Near about the same period we

* Died at Rome, A.D. 17.

† Homer fl. 907 B. C. Herodotus of Halicarnassus, B. 484 B. C.

‡ Thales, a philosopher, born at Miletus, 646 B. C.—Democritus, Thrace, died 361 B. C.—Empedocles, Agrigentum, fl. 440 B. C.

* Hippocrates died 361 B. C.

find a distinction made by Praxagoras*, of Cos, between the veins and arteries, he supposing that these last contained air or spirit; at the same time he teaches us to judge of the blood and diseases, by feeling the pulse, a circumstance much overlooked by Hippocrates, by which his descriptions of disease are much less accurate than we have been taught to believe. We are ignorant of the state of learning in the eastern nations at or before this period; almost all we know is, that the philosophers of Greece travelled into different parts for their improvement, and that physic was brought to some perfection in Egypt by the physicians being confined to the treatment of a few diseases. At this time an academy was founded at Alexandria, by the Ptolemies, the successors of Alexander, which subsisted near a thousand years, and in which medicine and anatomy were so highly cultivated, that kings themselves were sometimes present at dissections.†

In the works of Galen the names of many anatomists are handed down to us, two of which more immediately merit our attention; I mean Herophilus and Erasistratus.‡ They appear to have been contemporaries, for the same discoveries are attributed to both, besides numberless improvements in anatomy, which are many of them still retained. In the works of both authors there is a description of vessels which can only be applied to those we call lacteals, which take in our nourishment; and in both we find not only the nerves distinguished by a particular name appropriated to them, from the other harder substances, as the tendons of muscles; but the office of the nerves is ascertained by simple and decisive experiments. They have also described the several parts of the heart, its valves, &c.

We know but little of the state of medicine among the Romans for several ages. We find in the Roman writers, and pretty early after the foundation of Rome, the term *Medicus* employed, but in reality their physicians were slaves or freed men, who practised without a knowledge of anatomy or surgery, and without rational principles; and, I apprehend, we may say that physic, as well as anatomy, was introduced as a science by the Greek physicians, after the conquest of Greece; and before the Christian æra it does not appear that anatomy was practised amongst the Romans.

C. Celsus* speaks of several physicians before him. In the preface to his work he recommends the study of anatomy, and gives a slight description of the organs of the body, which, though short, is by no means incorrect. His description, however, is in a great measure, though not wholly, borrowed from the Greeks. Not long after this, Rufus† and Soranus appeared towards the beginning of the second century, and wrote some original pieces. Before the close of the 2d century there appeared a most extensive and elaborate work written by Galen, which is enriched with the learning of former ages, and in which we find so many of the minute parts of the body described as in numberless instances to rival the moderns, and the whole is connected so plausibly into a system that his opinions were adopted for more than 1200 years, till experiments and more accurate observations were at length introduced, and showed the fallacy of many parts of his system. He has traced the origin, course, and termination of the nerves, and he seems to have traced the blood-vessels further than was done before him. In many parts he is thought to have thrown considerable light upon the functions of the different organs by decisive experiments, as the use of the muscles, the action of the heart, the state of the blood, the manner in which the voice is formed, the use of the several nerves, &c.; but, upon the whole, notwithstanding, we allow that Galen's anatomy was universal for twelve centuries, and that his physiological opinions were adopted still later yet I must observe, that his description, were always drawn from quadrupeds. and his opinions are to be received with caution and reserve; they are generally hypothetical, and therefore justly in the present age laid aside.

In the fourth century, the Roman empire was overrun in the west by barbarous nations, and learning extinguished, which did not soon revive; while, in the eastern empire, the physicians continued still to build their practice on the anatomy of Galen. Oribasius was born at Pergamus, and flourished about the middle of the fourth century; he is represented as the greatest physician and scholar of this period, and a man of very engaging and agreeable manners; his interest is said to have been so great as to have contributed very much towards the advancement of Julian to the empire, who in return made him quæstor of Constantinople; he, however, fell into such disgrace in the succeeding emperor's reign as to have his estates con-

* Athens. A.D. 345.

† Claudius, G. Pergamos. B. A.D. 131.

‡ Herophilus flourished 300 B.C. Erasistratus, 294 B.C. The first is said to have carried his enthusiasm so far as to have dissected living subjects.

* Celsus flourished A.D. 17.

† Rufus, of Ephesus, flourished about 110 A.D., and practised at Rome.

fiscated; he was banished and delivered to the barbarians, amongst whom in a short time he was treated with idolatrous reverence. He was afterwards recalled and reinstated in his riches and dignities by the Roman emperor. Oribasius wrote about seventy volumes, chiefly copied from the practice of Galen, in consequence of which he was styled the Simia Galeni. Oribasius was the first who noticed a species of madness called by the Greeks Λυκανθρωπια, which is described in the following manner:

The persons affected go out of their houses in the night time, and in every thing imitate wolves, wandering among the tombs of the dead till morning; their looks are pale, their eyes hollow and dry their tongue exceedingly parched, and their thirst excessive. He was the first who has given us a description of the salivary glands; whether taken from Galen or not is uncertain, as some of Galen's works are lost. He says, "On each side of the tongue lie the orifices of the vessels which discharge the saliva, and into which you may introduce a probe."

These vessels take their rise from the root of the tongue where the glands are situated. Actius flourished much about the same era, but wrote chiefly on surgery.

In the seventh century, Alexandria was taken by the Arabians or Saracens, under the command of Omar, their first Caliph; the academy founded there, and which had subsisted near a thousand years, was entirely dispersed, and a celebrated library, the repository of learning in the eastern part of the world, almost entirely destroyed (by fire). History informs us, that although the volumes were distributed to the public bagnios for the purpose of fuel, yet in six month's time many books remained unconsumed. At length, when the Saracens came to be better settled in their possessions, they began to look into the remains of the Greek and Roman writers, and to translate such works into their own language; and there are extant in different parts of Europe, particularly in the library of the King of Spain, several of their translations from originals which have been lost, and were never published.

But they have made little or no improvement, except in having described some new diseases, such as the small-pox and measles, and in having mentioned some new remedies, the produce of their country.

Anatomy, however, could boast of no advancement, since, by the tenets of their religion, a person is supposed to be defiled by touching a dead body. At or about the eleventh century, academies and universities were erected in Italy and Montpelier in France, where they contented themselves with reading the books of the Arabians: and in the twelfth century, by a decree of the Emperor of Germany, Frederic II., no person was allowed to practise physic who had not studied anatomy. Thus, from the time of Galen, i. e. for near a thousand years, the pursuit of anatomy, far from making any progress, had been on the decline, the Greek learning was lost, and the original improvements neglected or forgotten; while the writings of the Arabians, in their incorrect state, were substituted in lieu of Grecian literature.

In the beginning of the fourteenth century, we find an original work composed by Mundinus,* about the year 1313, which, though imperfect in description, and rude in its style, by an order of the Senate of Venice, was the only one allowed to be taught by the professors of Padua. Before the middle of the following century, about 1440, the art of printing was discovered; and about the same time Constantinople was taken by the Turks, and science was again revived and diffused over Europe by the learned men who fled from the tyranny of those barbarians, and brought the original works of the Greeks with them into the west of Europe; so that before the end of the century we find several very tolerable compendia of anatomy, particularly those of Guido† and Benedictus.

In the sixteenth century, we find the spirit of improvement continued, several discoveries made, and we perceive traces of some circumstances of which there is little to be found in the ancients. In Nicolas Massa‡ we have a description of vessels which can only apply to the lymphatic system, and he speaks of the gravid uterus and ovum; but the merit of these authors is very much eclipsed by the great Vesalius, Sylvius, Fallopius, Eustachius, perhaps I might add, Columbus, who in a few years improved the description of the human body more than anatomists had done in former ages. Vesalius is said to have shown a very early genius for anatomy; he was born at Brussels on the 31st of December, 1514; and after the advantage of studying in different universities, at a very early period, viz. in the twenty-third year of his age, he was professor of anatomy at Padua.

He first published his "Epitome of Anatomy," and then his larger work, "De Structura Corporis Humani," at the age of twenty-five; in these he follows a very

* Mundinus of Milan, the reviver of anatomy, a surgeon; fl. 1315.

† Guido de Cauliaco, professor at Montpelier, practised at Lyons many years; at last at Avignon, and was physician to the Pope.

‡ Nicolas Massa wrote largely on the venereal disease.

excellent order, which he practised in teaching.

He gives a most elegant description of the parts of the body, in a pure and nervous style; he teaches beginners to follow him by dissection, and every where illustrates his descriptions by tables which are admired by artists to this day; (they were painted by Titian, the celebrated Italian historical and portrait painter, so much extolled for the justness of his colouring;) and towards the close of his works he mentions many curious experiments made upon living animals, to determine the functions of the several organs of the body, which have been overlooked by succeeding authors. In a liberal manner he divests himself of that very servile submission to Galen which so generally prevailed, and, indeed, he proves that Galen had seldom an opportunity of dissecting the human body, and that his descriptions were drawn from other animals; but Vesalius* himself sometimes falls into the same fault by substituting the anatomy of other animals, without sufficiently warning his readers. The reputation he acquired, drew upon him the jealousy of his cotemporaries, particularly of Sylvius, his old master, who published an ill-natured invective against him, in which he tenaciously defends Galen and the ancients, and rather than allow them to be wrong, insinuates that men in former times might be made different from what they are in their days; at the same time he himself treats Galen freely enough upon occasion.

Vesalius is the first, and not Riolan,† as has been said by some, who gave names to the muscles. Fallopius ‡ followed Vesalius, and more particularly described the body in the same order, every where endeavouring to correct and improve the works of Vesalius.

In like manner, Eustachius,§ imitating Vesalius and Fallopius, endeavours, not only by words, but by tables, to describe the several parts of the body, which he does in a more simple and accurate manner than was done in the tables of Vesalius; these tables of Eustachius were only discovered in the 14th year of the 18th century. Dr. Martin has given a very full account of them, and his book, with an explanation given of them by Albinus, completes the history of Eustachius's works.

We have now brought our brief history to within seventy years of the complete knowledge of the circulation of the blood by Dr. Harvey; this was discovered about the year 1628.

Anatomical knowledge was at this period more general in Europe. Fabricius, Spigelius, and Casserius succeeded one another in the University at Padua; and Riolan, who succeeded them, was for many years the standard in anatomy. Lord Bacon, about the latter end of the sixteenth century, shone forth as a bright luminary in the scientific world. He was son to Chancellor Nicholas Bacon, and born at York House, Strand, 1560. From infancy he was remarkable for his acumen, and by his unexampled assiduity, threw great light on the animal economy, and particularly on the circulation of the blood.

Lord Bacon was so thoroughly sensible of the use and importance of anatomy, that he even recommended the ancient anatomia vivorum, which, though discountenanced by Celsus, he thought might prove highly beneficial to mankind.

At this time great attention was paid to experiments, by which alone we can attempt to explain the mysteries of nature. We are now to describe the manner whereby the discovery of that system, which conveys the nourishment to the body, was first found out by Asellius in 1626; who, in the dissection of some living animals, observed the lacteal vessels upon the intestines and mesentery; and, attending to the course of the fluids, perceived them uniformly directed in one way, in consequence of certain resistances made by valves or flood-gates within them; and he at length remarked that the colour of the contents corresponded to that of the intestines, so that it appeared that they evidently served to take in our nutriment; and as the matter in our alimentary canal somewhat resembles a mixture of water and oil, which produces the appearance of milk, he gave them the name of lacteals. Of these we find imperfect mention in Hippocrates, Herophilus, and others, but they did not understand the true vessels. The circulation of the blood, as I have before observed, was discovered by Dr. Harvey, Physician to King Charles the First. He published a small treatise, "De Motu Cordis et Sanguinis," in which he has proved that our heart, arteries, and veins, form a circulation by which the blood is moved constantly and rapidly through the whole body; that from the heart it is con-

* Vesalius, however, is said to have opened the body of one of the grandees of Spain, thought to be dead; but, unfortunately, on inspecting the thorax, his heart was found still palpitating, which circumstance roused the Inquisition; but through the medium of Philip II. of Spain, his sentence was mitigated to a pilgrimage through the Holy Land.

† Riolan John, France, died 1605.

‡ Gabriel Fallopius, Italy; fl. 1523.

§ Bartholomew Eustachius, Rome; fl. 1550.

veyed by the arteries to the most distant parts; that the branches of these are joined to the veins, so that by the veins it returns again to the heart; thus, if a ligature be thrown round an artery, the vessels swell between the heart and ligature, but if the same be done before opening a vein, the vein swells below the ligature; if you divide an artery and a vein, in the artery blood is thrown from that side next the heart, while in the vein it is thrown from the part most distant from the heart; and, as the quantity evacuated in a given time is considerable, it is evident they must be connected with one another.

This doctrine, *which* at once overturned all the other systems, inasmuch as it explained a material part of the human economy, and paved the way for the discovery of many important truths, did not fail to draw upon Harvey numberless opponents. At first they endeavoured to set aside his data, but as time had furnished every evidence that could be required, the same men, unable to invalidate the truth of the system, endeavoured to show that he had borrowed it from the ancients; and this being an inquiry no less curious than useful, I shall enter upon it as far as appears necessary.

Vander-Linden, a learned critic, and some others, have laboured to prove that Hippocrates understood the circulation of the blood: that Hippocrates supposed the blood to be in motion is beyond a doubt, but when we attend to his expressions upon the subject, it appears evident that he supposed a flux and reflux of the blood in the same vessels, which he compares to the motion of the sea; and his comparing the body to a circle, is the clearest proof of his ignorance of the circulation, as he only means that the economy of the body is so unintelligible, that, as in a circle, we can neither find beginning nor end, so it is impossible to comprehend the functions of the body. He makes no distinction between the arteries and veins; and, with Praxagoras, he supposes that both are branches from the same general root or trunk: he undertakes to explain why the veins beat in some places and not in others; therefore, the further he proceeds, the more it is plain that he had no just idea of the real motion of the blood.

He scarcely pays any regard to the pulse, which any one acquainted with the true manner of the circulation must have done. After him the invention was ascribed to Plato, Aristotle, Erasistratus, Herophilus, &c. Some supposed that the name of artery was *justly* applied by these authors, and they found even the valves of these parts described. But we are not to argue from Aristotle's showing the nature of the valves in the heart, that he saw all the consequences that are derived from them; nor do we observe any where else in the works of Aristotle just ground for supposing him to have foreseen these circumstances. Erasistratus and Herophilus have still less claim than Plato and Aristotle. Erasistratus fancied that when the blood passed in the arteries, a fever was occasioned, and imagined that the blood rushed in as the spirit went out. Herophilus, in describing the pulmonary artery and vein, says, "That, although the pulmonary artery had the appearance of an artery, it served the office of a vein; and that the vein, in its nature, was an artery." He uses the terms arteria venosa, and vena arteriosa; so it follows from him, that the right side of the heart served to force the blood to all parts of the body, while the left was employed in conveying the spirit. The doctrines of Galen were so opposite to the Harveian system, that he has never been mentioned as having any claim to it; and yet, from his writings, more facts are to be collected pointing at a circulation, than are to be obtained from Hippocrates, or almost any other author, and which cannot be well explained upon any other supposition.

He sets out with observing against Herophilus and Erasistratus, that our arteries, in a sound state of body, confine and transmit the blood; and his proof is decisive. He lays an artery in view, ties it in two places, cuts out the intermediate piece, and finds it filled with blood. He describes the division of the aneurism into two species, and observes, that in the false, as well as in the true aneurism, the tumour is owing to the blood collected in the arteries, or effused from them. He traces the arteries, in many places, with surprising accuracy; he observes, that the branches of arteries were intermixed with those of veins, and supposes that they communicated. He knew, from having practised arteriotomy, that the arteries, in a given time, discharge a great quantity of blood; that all motion in them is rapid; and that the blood flows from them nearest the heart. He assigns the true use of the valves of the heart; and informs us, that when a ligature is thrown upon a member, the vein swells beyond the ligature.

In describing the position of the heart, he says, "that the septum has no holes, so that the blood contained in the arteries must pass through the lungs into them; and as a further proof of the communication the lungs have by means of the vessels with the rest of the body, he says, that in phthisis pulmonalis, where matter is collected, this descends into the aorta, and is carried off by urine.

His observations on the pulse may,

even at this time, be read over with advantage.

Joining these facts together, one would imagine that the knowledge of the real manner of the circulation of the blood could not have escaped him; nevertheless, we find he still supposes the motion is to and fro, like the tides of the Euripus, the blood sometimes passing from the arteries to the veins, and sometimes back again from the veins to the arteries; while the veins of the alimentary canal at one time take up the nourishment, and convey it to the liver, and afterwards bring it back again to the intestines.

And though his experiments point out the real motion, yet, instead of understanding that the arteries are dilated because they are filled by the action of the heart, he supposes that they possess the power of self-dilatation, and that the blood rushes in after the dilatation has taken place; as if a vessel full of water were tied to a pair of bellows, on expanding which the water rushes in to fill up the void, instead of imagining that the blood is driven in by the power of the heart, to force, as it were, the bellows asunder. So that Galen had, by no means, the most distant idea of the true motion of the blood.

The next to whom the knowledge of the circulation of the blood has been attributed, are the Chinese physicians.

It has been repeatedly affirmed by the first Europeans who travelled to that country, that the Chinese understood the circulation of the blood, and that they had a word in their language which literally expressed it; they also observed them to be very attentive to the pulse. Notwithstanding which, it may be sufficient to remark, that to this day, in different diseases, they feel the pulse in different parts of the body, not being aware that the number of strokes are alike in all. We also find mention made of Servetus,* who, in a medical tract, entitled "De Anima Mundi," says, that the whole mass of blood passes through the lungs by means of the pulmonic veins and arteries; and from this passage many have attributed to Servetus the discovery of the circulation of the blood, and have vainly endeavoured to deprive our immortal countryman, Harvey, of the honour of this important discovery.

Columbus, Aucantius, and Cæsalpinus,† are spoken of as discoverers of the circulation; yet we find nothing in them but what is copied from Galen. Cæsalpinus, indeed, goes one step further, and besides mentioning the lesser circulation through the lungs, supposes a larger through the rest of the body; but then he proceeds entirely on conjecture, and thinks it by no means constant and rapid; intimating that, when we were awake, the blood passes by the heart and arteries, and that, in time of sleep, it again returns by the veins, they being then more dilated, owing to the warmth and other circumstances. He imagines, too, that, at certain times, the blood may turn back again from the extremities of the body by the arteries to the heart, and there forcing its valves, may go to the lungs, the locus refrigerans, as it was called. With as little reason can Fabricius* be quoted, because he describes the valves that are to be found in the veins in many places. If, indeed, we attend to the full use of these, it follows that the Galenical doctrine must be reversed, the blood, in reality, taking a directly opposite course to that which he supposes for it.

But, by looking into him, we find that the valves are thought to prevent the blood from being driven in the Galenical course with too much impetus. The only author, therefore, that can have the most distant pretensions to such knowledge, is Vesalius. Not contented with speculations upon the subject, he undertook it by experiments; and the experiments of this great man are sufficient to establish the admirable Harveian system. It is surprising they were not referred to by the opponents of Harvey, for they appear with greater force than all those we have yet mentioned.

In the last book of his Anatomy, upon the subject of the arteries of animals, he proves with Galen, against Erasistratus and others, that the arteries naturally contain blood; he repeats the experiment of tying and cutting out an intermediate piece. He next observes against Galen, that the arteries possess no inherent power of dilating themselves; that in dilatation they are passive, and not active, or possessed of a vis insita, as he conjectured, which Vesalius proves by this decisive experiment:—He cuts an artery through transversely, by which means the motion instantly ceases beyond the incision; and lest it might be supposed that the vessel was deprived of its energy or influence, he joins the two parts again by a tube, and the motion is then restored even in the most distant parts of the body. He insists upon the rapid motion of the

* Michael Servetus, of Arragon, was burnt alive, through the intrigues of Calvin, in 1333, at Geneva.

† Andreas Cæsalpinus, an Italian, died A.D. 1603, aged 84.

* Fabricius, commonly called ab Aqua. Pendente, of Italy, died 1603.

blood in the artery, and upon the great quantity that is evacuated in a given time when an artery is wounded. He goes even a step further, and inquires by what power the arteries strike the fingers; and he solves it justly, that the arteries swell when the heart contracts, and that the contraction of the heart and the expulsion of the blood are the cause of the turgescence, the contractions and dilatations being exactly synchronous, and the force of the strokes proportioned to the degree of the contractions.

In various parts of his works, borrowing perhaps from Galen, he mentions the intermixture of the minute branches of the arteries and veins, and presumes that a communication takes place between them; observing, that when a ligature is thrown round the arm, the veins swell. He describes the valves of the heart, and, with Galen and Aristotle, assigns the true use of them; he admits of the lesser circulation through the lungs, and, to show this in the clearest manner, he describes a very curious experiment, which, strange as it may appear, has in our days been considered as the discovery of Dr. Hooke.

Vesalius observes, that upon opening the thorax of an animal, the lungs collapsed, and the motion of the heart ceased; but upon fixing a tube into the trachea, and driving in air, the free motion of the heart was again restored, and it performed its functions as before with violence, the contraction of the arteries corresponding to it. Now, from all this, we should suppose that nothing was wanting to describe the circulation. For if the whole quantity be expelled from the heart, where is the blood lodged?

No organ is sufficient to contain what the arteries are continually transmitting, and whence does the heart receive its supply without having some organ behind it, giving it as much blood as it sends out?

Nay, he had discovered the exact course as well as fountain of the blood; viz., its being sent through the lungs from the right to the left ventricle. Yet Vesalius did not see any such conclusions; he says there is no occasion to make any such experiments on the veins, because it is sufficiently known that the motion of the blood in them is from the heart; but he immediately starts the difficulty, Why do not veins beat, if the blood is conveyed in the very same manner as in the arteries? And this he ascribes to the softness of their coats, though he had said before that the pulsation of the arteries did not depend on their coats, but upon the force of the heart driving the blood into them.

Upon the whole, you will not find, in the history of physic, a stronger proof how far prejudice may influence the mind even of the most inquisitive genius.

And it is unquestionable, beyond all dispute, that we are indebted to Dr. Harvey for having explained the true motion of the blood, and that before him any circumstances relating to it were merely hypothetical.

Haller, that learned physiologist, says, "Dr. Wm. Harvey is the first who experimentally asserted the motion of the blood returning in the veins to the heart, in such a manner as to render the whole intelligible, and leave no room to doubt it." Again he says, "the Harveian circulation is, therefore, now received as an undoubted medical truth by every one."—(Dr. Hunter.)

We are, at first sight, pleased with the system of Galen: the drawing in the air by the lungs, and the finding the arteries empty, the two hearts divided by a partition not perforated, readily led him to suppose that the one side was intended for the motion of the blood, and the other only for the motion of the spirit.

Prejudice prevented those before him from seeing the true force of their experiments; and it may be doubted whether our most illustrious countryman, Harvey, has not more merit in seeing through the plausible systems of Galen and others, than if he had found it out by first making experiments upon the subject.

Notwithstanding this clear evidence, which Dr. Harvey produced in proof of his opinions, yet several years elapsed before we find them generally received amongst anatomists.

But soon after their inquiries took a different turn; and, instead of endeavouring to describe the larger masses composing the body, we find them by new arts attempting to disclose its structure and economy; and within the space of thirty years, from the date of Dr. Harvey's publication, we find very tolerable compendia of anatomy published, adapted to the new method by Glisson,* Highmore, and others, and several considerable improvements distinguished this period.

The duct of a curious gland, named the Pancreas, was now discovered;† and

* Francis Glisson, England, died A.D. 1667

† By Maurice Hoffman, professor of physic at Altdorf, in a cock turkey, 1641. Soon after, a complete system of vessels was observed by Bartholine and Rudbeck, named valvular lymphatics, from the colour of their contents, and from their particular structure, which vessels we shall prove constitute the absorbent system of animals.

Pecquet traced the lacteals, and thoracic duct, of which only an obscure description had been given by a former author, and the use before him was unknown; namely, to convey the chyle to the mass of blood.

Now, Malpighi, plainly observing that from our dissections we could only discover the larger masses and out sides of things, endeavoured, by other means, also to improve our anatomical knowledge, as by a comparison of different animals, and by the application of the microscope.

Ruysch, likewise, by means of injections, discovered a more beautiful vascularity in many parts of the body than was known in former ages. I shall forbear to enlarge at present on the anatomical abilities of Ruysch,* as I shall have occasion to speak of them when I come to treat of the method of making anatomical preparations, and the art of injecting animal bodies, in which he excelled, and from him it is called the Ars Ruyschiana, although, in reality, he was not the inventor, but only improved what he had been taught by Swammerdam, his master.

We are now come down to the time at which public societies for the improvement of science were instituted in different countries of Europe, of which the Royal Society of London, though not the most ancient, was the first that included anatomy in its plan, by which means this knowledge is more generally communicated. In the Philosophical Transactions, published by the Royal Society, there are many curious experiments throwing light upon the economy of animals. The general absorption which takes place in the body was demonstrated by throwing thin liquors into differents parts of it. An application of the doctrine of the circulation was made to the cure of diseases.

The practice of the transfusion of blood, attributed to Dr. Lower, was certainly known to Libavius, 60 years before the time of Dr. Lower, and the discovery is said to have been made by Sir Christopher Wren. I beg leave to refer those gentlemen who wish for more critical information on this subject to the Philosophical Transactions, and likewise to Mr. Portal's Preface to his Histoire de L'Anatomie, et de la Chirurgie. Dr. Lower, however, substituted the blood of one animal for that of another, attempting a transfusion of the blood by the force of the heart and arteries in one animal pushing the blood into the veins of another by means of communicating tubes, and in this way it was supposed that many diseases might be cured; but the danger that attends the attempt, and the remaining taint being soon communicated to the whole mass, caused it to be laid aside, although where the blood is much exhausted, and the operation is performed with due care, it may possibly be of use.*

It has been reported that an ancient grandee of Spain died under this process, which caused it to fall into disrepute. It is also said to have occasioned insanity, and was abolished by a public edict.

Sir Busick Harwood, the late learned Professor of Anatomy in the University at Cambridge, has made experiments on the transfusion of the blood.

About this time the German physicians began to publish the Ephemerides Germanicæ, in which they confined themselves chiefly to physic or such sciences as are subservient to it.

The French soon after instituted an academy at Paris, but by them nothing was published till about the 30th year of the late century.

They pay a particular attention to style and method; in consequence, their memoirs are written in a more correct way than those of any other academy. There was likewise an Academic Institution established at Berlin, and societies were formed in every large city in Europe. And with respect to authors in general, the number of their works is so greatly increased, that it becomes necessary to divide what remains into two periods, the one reaching to the end of the 17th century, and the other from that time to the close of the last.

Many in the 17th century were published in Italy, as those of Bellini, Gagliardi, Lancisi, and others; but the most celebrated is Malpighi. Several of the anatomists before him contented themselves with describing what could be detected with the knife; but he found in this way that we could hardly know more than the surfaces of bodies; he therefore had recourse to a variety of other means, he endeavoured to soften very hard organs, the bones for instance, by means of the muriatic acid, and to give a degree of firmness to the softer, such as the brain, &c.; in respect to all this, we have now improved methods, i. e. a solution of the oxymurias hygrargyri, and by the use of the alumen and nitras potassæ, we are enabled to pro-

* Ruysch's preparations were purchased by Peter the Great of Russia, but he soon afterwards made a fresh Museum.—Frederick Ruysch, Hague, b. 1638.

* Lately, however, this operation has been performed successfully by Doctor Blundell on a married woman. The blood having been taken from her husband, a plethoric young man, and immediately afterwards injected into a vein in his wife's arm, about 4 ℥.

secute our anatomical researches even in the sultry months of summer, and to retain the florid colour of the muscles, or even improve it considerably. Malpighi compared the structure of different animals together, and noted the changes produced by disease: he injected thin coloured liquors into the extremities of the vessels, and carefully applied the microscope, so that he is perhaps the first person who had ocular demonstration of the Harveian system, by seeing blood pass from the extremities of the arteries into the veins, without the interposition of any parenchymatous substance as was before supposed, and he throws considerable light upon the structure of several parts of the body; therefore he may be considered as the founder of the more accurate anatomy, so eminently useful upon many occasions.

In Switzerland, there seems to have been little opportunity of dissecting the human body, and consequently of improving anatomy; but Wepfer made, and published some experiments on other animals. In France, the study of anatomy was soon introduced, and the system of Riolan was followed; Du Verney, Dionis, Viensseus, and others, wrote upon the subject, but now, later works are substituted in their place. Amongst the Germans, human dissections seem to have been very circumscribed for some time back, yet many useful and learned works have been edited by that industrious people.

The Dutch have made some considerable advances in anatomy, the number and value of their works exceeding that of almost any other nation. Material improvements were undertaken by Kerkzingius, Swammerdam, Nuck, Raw, and many others; Riolan and Bartholine were supplanted by Diemerbroec, and Verbegen was considered as the fittest author for beginners.

Bidloo undertook an original work, explaining the structure of the human body with figures, which so far as they regard the painter and sculptor are excellent, but they are less useful from his not attending to the situation and connexion of the parts.

These have been since republished by Mr. Cowper, an old English surgeon, with a text in the same language, as well as in English. Writers in the 17th century likewise improved our knowledge of the human body very considerably, but less so by means of dissection, than the Italians and Dutch; several authors made a considerable figure after the knowledge of the circulation, as Glisson, Wharton, Highmore, and since, Ridley, but particularly Mr. Cowper; these have been universally considered as intelligent anatomists.

Cowper's first work was an account of the muscles, under the title of Myotomia Reformata; he afterwards republished his tables and those of Bidloo, with a new text to these last, so that by many Bidloo's plates were considered as his own.

With regard to the late century, we find in Italy the spirit of anatomical inquiries still subsisting for some time, though latterly it has been on the decline. The best works are those of Sanctorini, Valsalva, and Morgagni, the last of whom merits particular attention; we cannot however, without great injustice, pass over the minute and indefatigable labours of Antonio Scarpa.

In France, the chief writer is Winslow; he is perhaps the first author since the 16th century, who considered the body in its true situation, and his system is justly considered as the most correct we have.

We have several publications, too, from Lieutand; and still later, some very ingenious and excellent pieces by Petit, Bertin, Fosseau, Sabatier, and many others, not omitting Vicq d'Azyr, &c. The study of minute anatomy seems to have passed at this time from the Italians to the Germans, the number and value of whose works have for some time past exceeded those of any other country, though they are generally diffuse and tedious.

We have an excellent compendium of anatomy by Heister; a history of ligaments by Weibricht; Loder has also favoured the world with a most interesting work on anatomy. We have had likewise several very important observations which have been published in detached pieces in the collections of different societies, by the lynx-eyed Lieberkuhn, the inventor of the solar or camera obscura microscope, the first anatomist, I believe, who has had ocular demonstration of the beginnings of the lacteals on the villous coat of the small intestines in the human subject, and who has even seen and described their patulous mouths or orifices; these appearances he has represented, together with the minute anatomy of the blood-vessels, of the villous coat of the intestines in three of the most accurate and most beautiful plates that, perhaps, have ever been published. This account of the villous coats and lacteal vessels was printed in Latin in the year 1744, at Leyden; it is in such high estimation as to have become extremely scarce; for these very excellent reasons, my much valued friend and former preceptor, the late Mr. John Sheldon, a most scientific and public spirited man, Professor of Anatomy in the Royal Academy, has reprinted Lieberkuhn's work, and caused the plates to be re-engraved with an accuracy that

rivals the original; to which is added the author's life, and the whole of his other esteemed works, inaugural theses, &c.

The anatomy of the eye has been finely described by Zinn, the nerves by Meikel, the gravid uterus by Roederer, and others. To close the account of the Germans, we must mention the celebrated Haller, who has improved anatomy and physiology more than any in the age he lived in; he has written an amazing number of volumes upon these subjects, and his writings are generally considered as the standard books upon the different subjects he has treated.

On osteology, the work of Dr. Monro is certainly sufficient, with close application to the bones themselves, and a more elegant work in very large folio by Albinus with plates, will furnish every desired information. I need scarcely add, that our countrymen, Cheselden and Monro, have published large and justly esteemed works on this part of our science.

On the muscles, Innes's treatise, having a very proper reference to the muscles themselves, and the same work of Albinus, are quite sufficient.

On angeiology, we have Haller and Murray; in Eustachius and Albinus, we likewise find the blood-vessels described, as well as by many succeeding authors.

On the heart, we have Senac, Lower, and Nichols. On the nerves, Monro, Meikel, Scarpa, Albinus, and Eustachius.

On the ear, Duverney, Valsalva, and the enlightened Scarpa. For a beautiful and accurate description of the eye, we must refer you to Zinn. For an excellent account of the brain, you are recommended to peruse M. Vicq d'Azyr and Soemmering, or our countryman Willis. Albinus has written on the formation of bone, and you will likewise find ample information on the same subject in Dr. Nesbit's osteology, and some others. On the gravid uterus, the late Dr. W. Hunter published an elaborate work enriched with very large plates, and which alone, if other grounds were wanting, would immortalize the name of that celebrated anatomist.

Dr. Baillie has published an explanation; he has also written a work entitled "Morbid Anatomy," which possesses the greatest merit.

Mr. Burns, of Glasgow, has also lately written on the gravid uterus; and Professor Soemmering has taken up the subject from the earliest embryo, and continued it to that state of formation at which Dr. Hunter began. For the peculiarities of the fœtus, we have ample assistance in a treatise published by Dr. Trew, of Nuremberg, entitled, "Dissertatio Epistolica de differentiis quibusdam inter hominem natum et nascendum intercedentibus," with plates.

Nichols, too, has written on the same subject. On the absorbent system, Mr. Hewson, the late indefatigable anatomical teacher. Mr. Cruikshanks and Mr. John Sheldon are the most modern and the most esteemed authors.

For a history of the properties and component parts of the blood, Mr. Hewson and my first preceptor, Magnus Falconer, may be consulted; also Mr. John Hunter, whose enterprising and persevering anatomical spirit certainly stands unrivalled, and in whose invaluable works many new and important discoveries are to be found in anatomy, especially on the situation of the testes, and their passage in the fœtus, improperly called the descent, and on the relation between the mother and fœtus, on the minute distribution of the olfactory nerves, and on some particular ramifications of a twig of one of the branches of the nervous trigeminus; also the structure of the placenta, &c., besides an abundance of physiological observations; and in comparative anatomy, and in natural history, Aristotle himself, with all the succour of Alexander the Great, cannot be considered his equal. The most modern, and the most concise anatomical treatise which I may presume to recommend, is one published by my friend Dr. Hooper,* entitled, "The Anatomist's Vade Mecum, or Haller's Prælectiones Anatomicæ." For minute anatomy, you must consult Winslow and Haller, or "Soemmering de Structura Humani Corporis." Cheselden is a compendium for beginners, or Keill or Heister. In the "Schola Medicinæ Universalis Nova," of Dr. Rowley, you will find much useful information. The latest, however, and probably most beneficial work, is "Lizars on Anatomy in general," illustrated by plates, in folio.

In the ensuing course, nearly the same order which has by long experience been found the most conducive to the advantage of the student will be adopted; and after delivering some preliminary Lectures, we shall begin the osteology, then the myology will succeed; angeiology and neurology will follow the description of the muscles.

Splanchnology will fall in with the muscular subject; the peculiarities of the fœtus, and the anatomy of the gravid uterus, will be preceded by Lectures on the female organs of generation, both external and internal.

The male organs will be considered during the myology.

The structure of the brain will be in-

* Mr. Hey, of Leeds, has also written on the blood; Dr. Corry on the vitality of the blood; and Dr. Weish, in Phil. Trans.

vestigated when a fit opportunity occurs, and repeated, as often as means are afforded. Having demonstrated the compages of the human body, and treated of its physiology, we shall turn our attention to a practical application of anatomy, by describing such diseases as usually engage the attention of the surgeon, and then we shall proceed to the chirurgical operations, bandages, &c. Comparative anatomy will come in at the latter end of the course, after having relieved our minds from the more arduous and indispensable duties which we are bound to perform.

And having achieved this part of our engagements, we then shall be sufficiently at liberty to pursue speculations, which are but too much looked upon as only amusing; but if the distinguished abilities of a Hunter, a Monro, or a Camper, the brightest medical luminaries of the late century, and the first comparative anatomists then living, can at all stimulate our enthusiasm, we shall experience many truths from the dissection of animals.

Gentlemen, now suffer me to add, that contributing thus to diffuse the knowledge of a science scarcely more necessary to the practitioner than beneficial to our fellow-creatures at large, will be the pride, the pleasure, and ambition of my life.

MR. BRANSBY COOPER.

New Theatre, Guy's Hospital.

GENTLEMEN,

IT grieves me that the first word I have to utter in this theatre is one of discord; but most of you are aware of the circumstances which have this day occurred in one of the theatres of this Institution. It was my intention to have entered into the details of this transaction, but when I found that the Treasurer of Guy's Hospital had arrived here; when I found him, as indeed he is always to be found, at his post, and knowing him as I do, to be a man of high integrity and just feeling, and fully capable of judging between the rights of man and man, I thought I could not do better than leave the matter in his hands. He will no doubt form a just estimate of the conduct of Dr. Cholmeley on this occasion; I have no hesitation in naming the individual. (Cries of "Bravo!") I must still say, however, gentlemen, that it is not in Dr. Cholmeley's power either to raise or depress the name of ASTLEY COOPER. (Bravo!)

Gentlemen, before we enter into the subject of the lecture, I think it incumbent on me to say a few words on the structure of the building, under the roof of which we are now for the first time assembled, and where I trust many a lecturer may continue to pour forth one uninterrupted stream of science for years to come. I will not advert to the circumstances which have occurred to separate two bodies which, there was reason to suppose, were united by the closest bonds. I would say rather in the language of the great dramatic Poet:

"Be all the clouds that lower'd upon our house
In the deep bosom of the ocean buried."

But there is one topic on which I consider myself bound to touch, I mean the deep sense of gratitude which I entertain towards the Treasurer of this house for the honour which he has conferred upon me in placing me in this chair, and thus affording me the opportunity of addressing you. But I conceive he is entitled to a much higher eulogy than my poor tribute of thanks—he is entitled to the thanks of the public for having so nobly applied the funds intrusted to his hands, for the purpose of opening a new source for the diffusion of anatomical and medical knowledge. For what would avail the munificence of princes or generous subjects in founding institutions for the reception of the sick, if schools were not erected to teach that science which can alone minister to their sufferings?

Gentlemen, when we consider that the study of our profession, if pursued on scientific principles, enables us, by the removal of disease, to alleviate the only substantial affliction to which the human frame is exposed, we cannot but feel a deep sense of the importance of that station which we are destined to hold in the scale of society; nor can we avoid reflecting how incumbent it is upon us to establish the principles of the science on the most solid foundation. It is only by an accurate knowledge of the structure and functions of the human body in a state of health, that we can judge of the nature of disease, and act upon just and rational principles in its treatment.

The science which enables us to ascertain the structure and functions of organized matter is termed anatomy. That department which relates to the human body is termed human anatomy. And that which points out the differences of structure in man and the inferior animals, is designated by the term—comparative anatomy. In these lectures, I shall confine myself chiefly to the subject of human anatomy, without entering into that of the inferior animals further than may be necessary to illustrate some important differences in their structure and economy.

Before we proceed to consider the human body as organized matter, or attempt to investigate its constituent parts, let us previously inquire in what it differs from, and in what it resembles all common matter. We find that it possesses the essential properties common to all matter, such as extension, form, divisibility, inertia, and attraction. Hence we are led to conclude, that the animal, vegetable, and mineral kingdoms are but different modifications of the same elementary matter, and that in this respect there are points of similarity between the component particles of a man, an oak, and a mountain. Nor need man feel degraded by this reflection, for the modification of matter in the human subject is so much elevated in every respect, and so different in many, as justly to entitle him to the superior distinction of being called the noblest work of God. The vital principle, and the functions dependent on that principle, constitute a marked line of distinction between animate and inanimate matter. There are many points of affinity between the two classes of organized matter, namely, the animal and vegetable kingdoms. They both possess the power of producing changes within themselves, of generating new matter during their growth and development, and in this way recruiting that waste of the body which is constantly going on by the assimilation of foreign matter. These are the phenomena which constitute the great distinction between organized and inert matter; accordingly, those objects in which this inherent vital principle is found, are classed under the term of living matter, while those which do not possess it, are comprehended under the general designation of inorganic matter.

Living bodies are properly divided into two classes, animal and vegetable; but when they lose their vital functions, or in other words, when they are deprived of the power of appropriating and assimilating foreign matter into their own substance, they retain merely the essential properties of common matter, into which they resolve themselves, and in that state are capable of being affected by chemical agents. The characters which distinguish animal from vegetable matter are sufficiently marked; the former being endowed with sensation, thought, and volition, while the latter exhibits none of these phenomena. This distinction being recognised, we are now to consider in what respect man stands so pre-eminent above the rest of the animal world; for though the deductions of comparative anatomy demonstrate that he possesses properties peculiar to himself, and which distinguish him from all other animals, they do not sufficiently show that he is not only superior to all other animals, but that in fact he stands next to his Creator. It is not merely because man stands erect, or because he has two hands, that he is entitled to a separate and pre-eminent rank in the animal kingdom, but because he possesses the great faculty of reason or judgment, which enables him to distinguish what is advantageous or useful from what is inconvenient or pernicious. And thus when he feels an inclination to possess any object, he does not obey the mere impulse of such a feeling, but first exercises the great prerogative of man—judgment; considers whether the action meditated is right or wrong, and governs his conduct upon principles, and according to the dictates of a discriminating faculty with which no other animal is endowed. When this faculty is exerted to its full extent, it carries man beyond the sphere of self-interest, and prompts him to contribute to the general advantage of his species. If these distinguishing prerogatives of man be duly considered, it will require no argument to show that he is the master-work of his Creator's hand, and that whatever is calculated to improve man's condition, to promote his comfort, and to provide for his health, cannot but be an object of the highest importance.

Health, I need scarcely say, is the greatest of all earthly blessings; it enables the poor, by means of industry, to become rich, and the rich to enjoy the advantages of wealth. Without it the peasant must starve, and the monarch, in the midst of profusion, loathe the luxuries which surround him. It is the source of our highest enjoyments, and the last earthly object human eyes and human hope look up to. Impressed with this consideration, how grateful, how delightful must be our task in investigating the wonderful and beautiful fabric of man, and cultivating a thorough knowledge of his structure and functions in a state of health, in order to enable us to understand the changes which are superinduced by disease.

In this Introductory Address, it will be my object to lay before you the plan which I intend to pursue in this course of lectures, and to point out the best mode of acquiring a knowledge of the structure of the various parts of the human body; which branch of science is designated human anatomy. It is obvious that a knowledge of the human body, in a state of health, must be acquired before we can understand either its natural functions, or the changes produced by disease. After having investigated and described the structure of the several parts of the human body, I shall proceed to explain the use and functions of the several organs; which branch of science is termed physiology.

Hence we shall be enabled to demonstrate, that pathology depends entirely upon anatomy and physiology, or a knowledge of the structure and functions of the human body. To enter into a formal description of the several parts of the human body, would, on the present occasion, be superfluous; and I shall, therefore, only take such a general view of the subject as may lead you to consider how beautifully the machine is adapted to the use and purposes for which it is designed. The body consists of a duly proportioned aggregate of solids and fluids; and as it is subject to constant waste, this waste is supplied by the intro-susception of certain external substances, collectively termed food. Man is enabled to obtain the fresh supply requisite to his subsistence, through the medium of the senses of sight, hearing, smelling, taste, and feeling, four of which are exercised by particular organs, while the nerves adapted to that of feeling are distributed over the entire surface of the body. As the object of man's wants is more or less distant, it is necessary, in order that he may approximate to them, that he should possess the power of locomotion, and a form suited to the exercise of that power. A firm basis is obviously essential for his support, and accordingly, the whole structure is firmly secured by a substance termed bone, which gives support and protection to the surrounding soft parts, and maintains his proper stature. That they may not add too much to the weight of the body, the bones are hollow, and are thus rendered considerably lighter, without any diminution of their strength. As the bones are the basis of locomotion, and are to admit of the most rapid movements of the body, it is necessary that they should not constitute one continuous mass; we find them, therefore, divided into a great number, and so disposed as to play easily, and adapt themselves readily to the various motions of the body. At their extremities, we find a substance admirably adapted, by its smoothness and elasticity, to prevent concussion and friction, which substance is called cartilage. In the joints, which are entirely under the influence of the will, we find this substance merely tipping the extremities of the bones; but where the motion is confined, we find the cartilage firmly uniting bones together; as, for instance, the ribs to the sternum. Still further, to prevent friction, besides the cartilages of the bones, there is a fluid termed synovia, which is poured out from the extremities of arteries, terminating by open mouths in the internal surface of a synovial membrane, which prevents the escape of the fluid. This apparatus is always found at articulating surfaces, and the quantity of synovia is proportioned to the extent of motion in the joint, and the consequent danger of displacement. Another structure, forming part of every articulation is ligament, so called from its efficacy in binding the bones together. Ligaments are strong inelastic membranes, connecting the extremities of moveable bones, so as not to interfere with motion, except where it has a tendency to be carried beyond the natural extent, which the ligaments do not admit without rupture. In this way the fabric of the body is rendered capable of being moved; and I shall now proceed to consider the manner in which the motions of the body are effected.

Here we have to observe the muscles, which are the moving powers of the body. Muscle is derived from the Greek word, μυειν, to contract, from a property peculiar to this substance. Muscles are soft elastic fasciculi, connected by cellular membrane, and in the human subject they are generally of a red colour. When we trace a muscle, we find it originating from a considerable extent of surface, gradually converging into a small space, to be united to a small chord, called a tendon. This tendinous structure consists of fibres of a white colour, firmly connected together, and extending in a uniform direction to the muscle to which it is attached. By the contraction of muscles, motion is produced; thus the brachialis internus is one of the muscles intended to raise the forearm; and by the contraction of this muscle, the coronoid process of the ulna, which is the bone into which it is inserted, is brought nearer to the os humeri, from which it arises, and in this way the elbow-joint is bent. The joints are provided with as many muscles as are necessary for the different motions of the body; each muscle moving in a proper direction on the bone to which it is attached. The extent of power in a muscle is proportioned to its size, or the number of fasciculi composing it; hence the different degrees of power which we observe in leaping, running, and performing other motions of the body. When you have thus considered how the fabric of the human body is capable of being moved, and how the muscles produce the various complicated motions of the machine, you will have no difficulty in comprehending the physiology of locomotion. In walking, for instance, the first object is to fix one part of the body so that the other may be subservient to the action of voluntary muscular power. The weight of the body is thrown to one leg, that the other may be capable of free motion; the muscles being brought into action, the limb is raised and extended; the body brought forward by the muscles of the fixed side, and its

weight transferred to the advanced limb, which in its turn becomes fixed, and set the other at liberty to repeat the step. I have supposed that the great purposes of locomotion are to enable the animal to approach its food, and to remove from such objects as may give it more or less disturbance. Here we recognise a great distinction between the animal and the vegetable, for while the former is capable of changing its situation, whenever it is necessary to procure food, the latter is compelled to remain stationary.

By the aid of loco-motion, man is enabled to procure all the substances capable of being converted into nourishment by the action of the digestive organs. There is a great variety of such substances, for man is said to be an omnivorous feeder. The food is conveyed by his hand to his mouth, which is opened for its reception; it is next masticated by the action of the lower and upper jaw, formed into a bolus by the tongue, lubricated by a fluid of the mouth, and thus rendered fit to be swallowed, and also to undergo certain changes in the stomach. The food thus masticated is passed by the action of the tongue on the soft palate into the cavity of the fauces, towards the pharynx. The pharynx is stimulated by the presence of the food to contract, and the food passes into the œsophagus, by the action of whose muscular fibres it is conveyed into the stomach.

Having thus noticed the organs necessary to the process of deglutition, I shall proceed to those of digestion; and, first, I shall advert to the stomach, which is a membranous bag, situated in the cavity of the abdomen, and which establishes another important distinction between the animal and vegetable kingdoms; for vegetables imbibe their nourishment from the surface, while animals partly receive it into a stomach. This receptacle is found in every animal, and may be considered as constituting the organic difference between the animal and vegetable world. The process by which the food is converted into nourishment, which constitutes the peculiar office of this organ, is termed digestion. The food is first converted into a pulpy substance, called chyme, by the action of the gastric juice; it then passes through the pylorus into the duodenum, where it is mixed with other fluids, the bile, the pancreatic and the enterie juices, and converted from chyme into chyle. The whole of the food, however, is not converted into chyle; a considerable portion of it passes away as useless and feculent matter. That portion of it which is to be converted into nutriment is taken up by the absorbent vessels from the small intestines, which are furnished with a number of folds of a valvular structure, called *valvulæ conniventes*, which produce a difficulty in the passage of the feculent matter, and enlarge the surface for the lacteals to take up that portion which still may be nutritious.

I have entered somewhat more at length into this subject than is usual, perhaps, in an introductory lecture, in order to show how the continual waste or wear and tear of the body is supplied by the assimilation of those substances, collectively termed food. Let us now proceed to trace the alimentary part of the food from the stomach and intestines into the vital system, or, as it is commonly called, the circulation. The food having been taken by the lacteals from the intestines, passes through a membrane called the mesentery, and if examined shortly after an animal has taken food, it is found in this state to consist of a white opake fluid resembling milk. It passes from the mesentery to a large canal called the thoracic duct, which arises from the loins, passes along the spinal column through the chest, and is terminated at the junction of the internal jugular, with the subclavian vein. The direction of the fluid in its passage to the thoracic duct is uniform; and there are certain valvular apparatus, which present an insuperable resistance to any retrograde motion. It is thus conveyed into the blood to be circulated with it, and to assist in the support, growth, and reproduction of every part of the body. We find, therefore, that though the constituent parts of animal bodies are so different in many particulars, they are all formed, and capable of being resolved into one common element. The blood is itself composed, however, of several constituent parts, which is demonstrable from the separation which takes place when it is drawn from the living body. With respect to the circulation of the blood, we cannot consider it without being reminded of the great and immortal name of HARVEY, who first comprehended and explained that phenomenon, and whose fame will survive as long as a heart beats in demonstration of his discovery. As the blood conveys the means of nutrition to the whole system, it is propelled from the heart to every part of the body, and conveyed back again to that organ.

The heart is a hollow muscle, situated within the chest, composed of two cavities, separated by a partition. These cavities are each divided into an auricle and a ventricle, which communicate with one another: thus the heart is divided into a right and a left side, the former receiving the veinous, and the latter the arterial blood. I know not that I can better explain the nature of this apparatus than by describing the circulation. In the first

place, then, two large veins, called the *venæ cavæ*, convey dark-coloured blood to the right auricle: a portion of this cavity, being muscular, is capable of being stimulated by the presence of blood; hence it contracts, and propels its contents into the right ventricle, which, in its turn, contracts. The fluid, prevented by a valve from returning into the auricle, passes into the pulmonary artery, and is conveyed to the lungs, which are a spongy parenchymatous organ, occupying a considerable part of the thorax, and admitting ramifications of the windpipe, so as to be freely permeated by atmospheric air. By the minute distribution of the pulmonary artery, the blood is brought into contact with the air, and undergoes a chemical change, which, among other results, produces that of converting the fluid from a black to a red colour. It is then received by the four pulmonary veins as blood suited for the supply of the body, and conveyed to the left auricle, from whence it passes to the left ventricle, and here ends the proper circulation through the heart and lungs. At this stage, a fresh mechanism is required to convey the blood to every part of the frame. This requisite is supplied by a series of elastic tubes constituting the arterial system; through these arteries the blood receives its first impulse from the contraction of the heart, which is called the *vis à tergo*, and which is maintained by the elasticity of the external arterial coat.

By some physiologists, however, the flow of the blood through an artery is supposed to depend on a muscular power resident in those vessels. The trunks of arteries diverge into innumerable ramifications in extending toward their termination, and expend themselves by inosculating with veins. These may be considered as the second division of blood-vessels, and they are sufficiently distinguished by the different colours of the fluid which they circulate. The change of colour arises not from the abstraction of any thing from the blood, but from the absorption into it, during its course from the heart, of new matter, effecting this alteration by its chemical agency. The veins take their origin, in minute branches, from the capillary extremities of the arteries, and, by their progressive union, ultimately form the two great veins already designated the *venæ cavæ*, which empty themselves into the right ventricle of the heart. In the interior of the veins we find a valvular structure adapted for preventing the regurgitation of the blood.

The respective offices of the three kinds of blood-vessels, namely, the vein, the ventricle, and the artery, must now be sufficiently apparent. The veins convey the chyle and blood towards the heart; the artery carries the blood from it, and the ventricle gives the necessary impulse on one side to the lungs, and on the other to the arterial system distributed throughout the body. The necessity of the pulmonary circulation, and of the ejection of something that is incapable of sustaining the vital functions, is rendered abundantly manifest by the fact, that exhaled air is not calculated to support life. To prove this fact, let an animal be confined under an inverted glass, so adapted for the experiment, as to prevent the admission of fresh air, and the animal inhaling only that which it has breathed, will soon die. The purpose of the auricles appears to be that of serving as a receptacle for the venous blood, while the ventricles are acting upon that in the arteries, for they are rendered sufficiently distinct from one another by means of valves, during the action of the ventricle, to be prevented from acting upon the auricle during their contractions. Hence, it is clear, that the two auricles and the two ventricles must operate in unison, they must act synchronously. By the active force of the ventricles such an impetus is given to the blood as to produce distension and momentary change of place in the arteries, a phenomenon, which is commonly termed pulsation; but in the veins the blood flows in an even and uniform current, the momentum originating in the heart being expended ere that fluid has reached them.

Having thus described the circulation of the blood under its two systems, the venous and the arterial, one serving to build the body while the other supplies the materials, we will now direct our attention to the means by which the various and very different parts which constitute the human frame, are all produced from one homogeneous fluid. We shall find that this wonderful result is ascribable to the extremities of the arteries, and is effected by what are called the functions of exhalation and of secretion. The difference between them I shall now attempt to explain.

The fluids, we find, are produced by exhalation where arteries terminate upon any surface by open mouths, under so peculiar an arrangement as to allow the separation of certain of the constituent parts without the intervention of any organ, the separation taking place from the vessels themselves. On the other hand, the mechanism which produces the secreted fluids is much more complicated, and effects in them an infinitely greater difference than the blood itself. For instance, if we examine the bile or the saliva, we discover in it properties widely van grd

from those possessed by the blood; while the exhalant fluids bear a great resemblance to what the blood would become if deprived of its red particles. For elaborating the change in the one case, there is provided a substance called a gland, into which arteries ramify, and in which arise a new set of vessels termed excretory ducts, for the conveyance of the fluid to some organ in subservience to a peculiar function; in the other case the exhaled fluid is usually returned into the circulation by the process of absorption. Thus it would appear that the great difference between these two processes is, that the one is very simple, and the other extremely complicated.

By means, then, of secretion and exhalation, we can conceive the abundant supply furnished to every part of the body to be produced from the ramifications of the arteries. We find that exhalant vessels are constantly pouring out fluids, as for instance, within the cavity of the peritoneum and the synovia, for the purpose of lubricating the joints. This fluid would be constantly accumulating within the cavities of the articulations, were it not for another operation, which is in constant progress, tending to maintain an exact proportion between the fluid secreted and the fluid absorbed, and thus preventing distension in the secreting cavities of the body. It may be proper, therefore, to take a general view of the manner in which this absorbent system originates, and of the purposes it is destined to serve; for we shall find that while the absorbents act as the constructors of the body, they remove what is superfluous or injurious, and take up what is adapted for its nutriment and advantage. These vessels are found diverging into ramifications like the arteries, arising from all the mucous and serous membranes, and also from the cellular membrane. They anastomose like arteries, and form large trunks, which do not pass at once into the thoracic duct, but subdivide and enter into an interjacent apparatus called absorbent glands.

The vessels into which they thus subdivide are called vasa inferentia, and those which pass out from the same gland are called vasa efferentia; the former have the superiority in number, the latter in capacity. On examining the structure of these vessels, we find their parietes thin and semitransparent, composed of two coats, the inner coat forming folds which are termed valves, and which resist any retrograde motion, to a degree exceeding the apparent firmness of the vessels. These vessels have the power of taking up the fluids that come in contact with their orifices, and of conveying them to the circulating blood; the exercise of this power is termed absorption or inhalation, and it must exist wherever such vessels occur. It is also to be remarked, that the absorbents are adapted for the removal of solids, which, however, must have previously undergone solution. It is an ordinance of nature that animals should have the power of propagating their own species, and they are consequently provided with generative organs, in the respective formation of which consists the distinction of the sexes. These organs in either sex are divided into external and internal; the external may be considered as destined for the purpose of coition; the internal, in the male subject, includes the apparatus necessary for producing impregnation, while those of the female are adapted for conception and gestation.

The subject to which I shall next advert, is the cellular membrane, the great medium of union between all the divisions of the body, serving to connect not only the more distinct parts, but even the minutest fibres into which those parts are divisible. It may be regarded as consisting of two species, the true cellular membrane, and the adipose; the extension of the former being universal, while the latter is excluded from the eyelids, the scrotum, and every other part, where the presence of fat would interrupt or impede an essential function.

The whole exterior surface of the body we find to be covered with a strong elastic integument called the skin; it is divided into two layers, of which the internal is called the true skin, while the external is denominated the scarf-skin or epidermis. Anatomists have distinguished a third layer, which, from the characteristic colour, is quite manifest in negroes, and this they denominate the rete mucosum. It is the property of the skin not only to afford support and protection to the organs beneath it, but to exercise functions peculiar to itself, namely, the exhalation of a gas, and the exudation of the perspirable matter, and of sebaceous secretions, while it permits the excrescence of the hair.

Having thus far investigated the structure of the human frame, and developed its capability of movement by means of muscles adapted for that purpose; having also shown how the food taken into the system becomes susceptible of assimilation with that fluid which supplies and renovates its constituent parts, and having examined the processes introductory to that assimilation, we are now to observe, that this wonderful organization would remain inert and immoveable were there not a medium of communication between the intellectual faculties, comprehensively termed mind, and those organs

which are subjected to the influence of the will.

Man is therefore furnished with a nervous system—consisting of brain, spinal marrow, and nerves, which being acted upon by various sensations, produce impressions on the mind in its supposed residence, or sensorium, the brain. I say its *supposed* residence, because in tracing the connexion of matter with mind, we lose the clue of demonstration, and have only strong inference and conjecture to guide us;—it is a subject beyond the scope of mortal comprehension.

The brain is situated in the head, the spinal marrow is placed in the vertebral column, and the nerves are distributed throughout every part of the body. All these parts of the nervous system are more or less connected with each other, and are reciprocally subservient. The impressions which the brain is capable of receiving are said to be of five kinds, corresponding with the five senses, of which we have already spoken in the commencement of this Lecture; but it would be more correct to say, that each of those senses communicates its peculiar *class* of impressions. That of touch, for instance, conveys to us the notions of roughness, of smoothness, of hardness, with many others; and the same remark may more or less apply to the rest of the senses. Without going into detail, we may observe, with respect to these sensations, that they are conveyed from without, through the respective nerves, to the sensorium, the brain. But this organ is endowed with another faculty, denominated volition, which proceeds from it, and extends instantaneously through the intermediate nerves, to such organs or parts of the body as are subject to its dominion and control.

The grand distinction between sensation and volition is this—sensation commences at the extremity of the nerves and passes to the brain, while volition originates in the brain and passes through the nerves to the limbs and other parts of the body, that are susceptible of voluntary action. Having noticed the two great qualifications of sensation and of will, as peculiar to the mass of the nerves, I may now observe, that the latter are constantly subjected to another kind of action, which is in no degree under the control of the will, and which influences the involuntary functions of life. This influence is exercised through the agency of the *sympathetic nerve*, that supplies those organs of which the constant action is essential to existence. This nerve is connected with the brain as well as with the spinal marrow, and from their union may be solved the problem—why mental impressions are capable of affecting the involuntary and merely mechanical action of certain organs. Thus we may account for the acceleration in the beating of the heart, and in the peristaltic motion of the intestines, when the mind is actuated by fear or any other strong emotion.

Not only does the brain serve as the principal abode of those qualities which are capable of sustaining the indispensable functions of organic life, but it is the consistory, the council chamber, where the intellectual functions are exercised, and all mental operations performed.

In the brain reside conception, the offspring of impression—memory, including not only the power of remembering, but of recollecting, at will, events or facts which have once been known—imagination, or power of forming new combinations—and judgment, or the faculty of deciding between right and wrong, between truth and falsehood. All these, when cultivated and improved by proper exercise, serve to qualify and accomplish man as a social being, and elevate him to that station which his Creator intended him to obtain, as the lord of the lower world.

It now remains for me, Gentlemen, to address to you a few words on the subject of those duties which you owe to yourselves, to your parents, and, indeed I may add, to the community at large; for upon the faithful and zealous fulfilment of these duties depends the question, whether you are to be the most useful or the most dangerous members of society. I feel, therefore, as Surgeon to this Hospital, and your teacher of anatomy, that it is not one of the least of my duties towards you to point out to you the necessity of a judicious application of your time during your stay at this school. The interest I take in your welfare, the anxiety I feel for your eminence, the satisfaction I shall ever derive from having contributed to it, and the (I trust not misplaced) hope I entertain of my wishes being realized, call loudly on me to entreat your assistance in the undertaking. It were superfluous in me to remind you that it is not on me, but on yourselves principally that your future success depends.

The science of anatomy is easily attained when the determination of attaining it is sincere; no difficulties will present themselves which attentive assiduity cannot surmount, and no barrier will be opposed to your ultimate success, which idleness has not erected. In this science, as in others, there are many who profess to show a shorter road to excellence than industry; and many expedients have been invented, by which the toil of study may be saved. But let no man be seduced to idleness by specious promises. Excellence is never granted to man but as the

reward of labour. It evinces, indeed, no small strength of mind to persevere in habits of industry, without the pleasure of perceiving the advances; but which, like the hand of a clock, while it marks hourly progress to the point, yet proceeds so slowly as to escape observation.

Remember that anatomy is the basis of surgery, and if the basis be not solid, the superstructure cannot be secure; there scarcely exists a case in surgery wherein the knowledge of anatomy is not required; and I have little hesitation in asserting, that where professional disgrace has fallen on any of our profession, there are comparatively but very few instances in which the causes of that disgrace may not be traced to ignorance of this department of it. Should you, as it will probably happen to most of you in the course of your practice, be summoned to give evidence in a court of justice, when the Bench look to you for the illustration of the case before them, and the life or death of the culprit rest solely on the evidence you may adduce, consider what an awful responsibility is attached to you—the Counsel engaged take care to furnish themselves with all the necessary anatomical knowledge that the case may require, and your professional reputation may be materially affected by your replies. Medical men are, perhaps, more depreciated in public estimation by forensic evidence than by anything. Questions are put by Counsel, which require a most minute knowledge of anatomy and pathology to answer satisfactorily; and the hesitation which must inevitably attend on an imperfect knowledge of the profession, will produce a most unfavourable and detrimental impression on all who are present.

Agitation can scarcely be admitted in defence in a profession, where presence of mind is an essential requisite, and even the diffidence which attends so commonly on real talent and acquirement, will be considered but too frequently with an illiberal misrepresentation. That the path to eminence is rugged, and the ascent steep, I freely admit; were it not so, there were but little merit in reaching the summit; nevertheless, the way is open, and the path before you; and as far as confidence may be placed in the guide, who will conduct you? I pledge myself that you shall not be deceived. Though I stand here as your teacher, it would be my prouder boast to be regarded as your fellow-labourer. I would wish you to look upon me only as one who has toiled through the journey, and is about to recommence it with you, only that I may facilitate your progress. Whenever, therefore, you may do me the honour, gentlemen, of soliciting my assistance, rest assured that I will afford it to the utmost of my ability; and if I can contribute by any exertion of mine to your instruction and advancement, I shall feel a happiness commensurate with the benefit you may derive. I hope that I am addressing those who are as anxious and as determined to become useful members of society, as I am, as far as in me lies, of rendering them so. You have selected and embarked in a noble, an honourable and useful profession; and I doubt not but you feel determined to uphold its respectability. Remember, you are about to be surrounded by a multitude of temptations, which it is difficult to resist, and will require no ordinary share of fortitude and self-denial to withstand.

There are amongst you those who are gifted with education, address, property, and personal appearance; these qualities will, however, prove either your best friends or your bitterest enemies. If the money which your relations have spared you for the purpose of your education, or generously bestowed on you for your personal comfort, be wasted in folly and lavished in extravagance, and your time sacrificed in idleness, you will return home with the remorse of conscience which is inseparable from such conduct, and you will meet their frowns instead of being received with affection—their liberality abused, and all their hopes defeated. There may be some amongst you who, having nothing but their own industry to depend on, who look alone to their labours for their livelihood, and who must ultimately beg or starve if they neglect their duty. "Slow rises worth by poverty depressed," I reluctantly acknowledge; but it may be no small consolation to them to be reminded, that some of the brightest ornaments of whom our profession is proud to boast, have worked their way from poverty to affluence, from obscurity to immortality.

It is not your daily attendance in the lecture-room, or your appearance in the dissecting-room, in mere compliance with the customary routine of study will avail, unless your attention be exclusively devoted to the subject before you. Let not your time be occupied in taking notes of my lectures. I shall advance little that books on anatomy will not supply, and that which is committed to paper is too often lost to memory. When you go home from lecture, then recal to mind what has been told you; it is the notes taken after lecture that will most avail; what is then written is easily recollected, whilst dissection will rivet it in your memory, and complete you as anatomists.

A few words gentlemen, on your conduct

when you have embarked in the practice of your profession, and I will trespass on your time and patience no longer. It is not your being well acquainted with anatomy, and having qualified yourselves fully to become even celebrated as surgeons, that will command your professional advancement; the moral character, the general line of conduct, the kindness and attention to patients, the pains taken, in short, to render yourselves beloved as men, as well as looked up to as surgeons, will materially influence your success. You will be summoned by numberless and various difficulties; but he who cannot stem against the adverse tide should not embark in the troubled sea of life. Remember that in proportion as you become an object of envy to your competitors, you will also become an object of detraction.

When you meet with scientific men, treat them with the respect they merit; when with ignorant practitioners, bear with them. Do your duty towards your patient, but never for a moment imagine that the ruin of another professional character can be the stepping-stone to your exaltation. A little reflection will always point out to you what is the most amiable, as well as the most honourable part to be acted; and as I feel no doubt but that you are determined to become good surgeons, let me say it is a no less worthy consideration to endeavour to become as good men. With these few hints I now dismiss you, and return you my best thanks for the patient attention with which you have listened to me. Let me once more beg of you to employ your time to the best advantage, and give the Lecturers of Guy's Hospital reason to be proud of your extensive scientific attainments.

Mr HEADINGTON.

Theatre, London Hospital.

GENTLEMEN,

From the situation which I have the honour of holding at this Hospital of anatomical teacher, it devolves upon me to address you upon a subject not certainly either uninteresting in itself nor unimportant in its consequences.

Education, or the attempt of implanting in the minds of others that knowledge which we ourselves have acquired has ever been regarded of the first importance to the general good of society, and to whose care so important a trust should be delegated has in some countries been regulated and restricted even by the interference of the legislature. Experience has, I believe, however proved that it is much better to let it be free and unshackled, and that the approbation of the public is the most powerful incentive to emulation. This observation, however, more particularly applies to those who have the superintendance of youth, and who have the direction of the mind at that early period when first impressions are hardly ever effaced, and when therefore the inculcation of good produces so permanent an effect. Such reasoning certainly does not apply with so much force to those whom I am now addressing, but it is certainly of sufficient consequence to obtain our attention.

In compliance with general custom, we are under the necessity of delivering what is termed an introductory lecture; I think therefore that our attention cannot be more beneficially employed than by reviewing the mode of education which is at present adopted, and by applying it to that particular science we are proceeding to pursue.

The profession of medicine is at present studied under three distinct branches, at least in this country. These distinctions are but of modern date, nor are the lines that separate them but imperfectly drawn. Amongst the polished nations of antiquity, the records of whose history we search for information relative to this science, we find that every part of it was studied and practised by a single individual, and in the times of the heroic ages great importance was naturally attached to surgery. Among the Egyptians, indeed the case was different, for we are informed by Herodotus, that among those celebrated people medicine was divided into many branches, and that an individual confined his attention to the study of a particular organ, and that medicine, like other parts of the profession, was hereditary. I believe something of a similar kind prevails over the vast extent of the Chinese empire. In the decline of the Roman power, and in the foundation of the present state of Europe from its ruins, medicine underwent considerable alteration, and a distinct class of men was formed, whose office was confined solely to the operative part of surgery, and that was performed under the guidance of a physician. Such being the state of things, no improvement could be expected in the art of surgery, and it must at that time have been a very imperfect practice.

On the revival of literature, considerable attention was paid to anatomy, and the office of the surgeon was gradually separated from that of the physician. At present anatomy is studied either with

a view to the practice of surgery or of physic. In either case it must be regarded as of particular importance and as constituting the very foundation on which each superstructure is to be raised. It has, however, been generally seen that a knowledge of this subject is of the greatest consequence to the surgeon, and that the physician may content himself with a less deeper search into this science. It must certainly be conceded that a knowledge of the relative situation, and particularly, of the more superficial parts of the body is of the most importance to the surgeon; but then it is equally true, that an explanation of the structure of them is more necessary to the physician. I think, therefore, that the balance is nearly equal.

The importance of this science cannot be disputed; we are then chiefly interested in respect to the best mode of acquiring it. The meaning of the word "anatomy" requires no illustration; it has been divided into human and comparative. By human is understood when man is the object of our researches; by comparative, when the rest of the animal kingdom becomes the subject of investigation. The former of these is the more immediate object of our inquiry, though, perhaps, it may be of advantage that this latter division should be considered; but it is still to be remembered that the latter are all subordinate to the former, and that dissection of animals is pursued chiefly for obtaining information on many of the obscure parts of man. From late treatises on this science, and by the more early writers, it appears, that the only opportunities which in former times presented themselves of acquiring knowledge on this science, was from the dissection of animals, and the knowledge obtained by punishment inflicted by magistrates, and from those whose misfortune it was to meet with an accident in the common occupations of life. From such a source but a very imperfect knowledge could be derived, a human frame being rarely, if ever, the subject of investigation.

Such being the case, their inquiries were chiefly confined to the dissection of animals. This circumstance sufficiently explains the errors that were constantly occurring in the writings of the older physicians. Since the revival of learning, by the industry of individuals, anatomical schools have been gradually founded in most of the greater populous cities and universities; and in this country Edinburgh took the lead, for which it was indebted to the exertions of Dr. Munro. His example was shortly followed by those who presided over the hospitals in this metropolis, and it is at least attended with this beneficial effect, that the lessons of the teacher become strengthened and enforced by practical information, and every one has a vastly greater opportunity afforded him of exercising his own judgment with respect to the soundness of the opinions he hears inculcated. By this means errors may be corrected, and the road thrown open for still further improvement.

This, gentlemen, is a very short outline of the history of anatomy; and in proceeding to explain the mode which I shall pursue in the succeeding lectures, I shall not detain you any very considerable period of time. The science of anatomy, which we are proceeding to investigate, has, by the exertions of individuals, attained a very considerable degree of perfection; and of course each teacher having an opportunity of availing himself of the discourse of his predecessor, the anatomical knowledge must be equally diffused, and the lectures of one teacher must, of course, in their prominent features, have a striking resemblance to those of another. The chief difference is this, that one teacher may give a more clear and more connected view of the subject under consideration than another in his mode of speaking, and the clearer the mode of speaking is, the more improvable it is to the understanding. It is in this latter point of view that the attendance of the lecturers becomes of such vast utility. I own many treatises convey to the reader almost every important fact that is inculcated to the hearer by the teacher, but the effect is by no means the same. What is read makes but a transitory impression; what is orally delivered steals as it were on the mind, and thus becomes engrained on the recollection. Besides, another particular advantage in attending the lectures depends on the subject being actually presented at the same time to the view of the pupil. So that the teacher has by words to describe what is already impressed by the subject before him.

The plan, therefore, which it is our intention to pursue, will vary but a little, if at all, from the one which is now generally adopted. In the first place, we shall make a few observations on animal matter in general, and shall then proceed to explain the principal properties of that fluid from which the body derives nutriment and support—the blood. The cellular membrane will next become a fit subject of consideration, it appearing to enter into the formation of every part of the body. The formation of the bones, the character-

istics which distinguish them from the other parts of the animal, and their diseases, will form our next object of inquiry. This will naturally be followed by a description of certain bones that enter into the formation of the human skeleton. From thence we shall proceed to the myology, or description of the muscles, or moving powers, prefacing our research on this subject, by explaining the laws of muscular action, and by defining the principal opinions that have been entertained on that intricate subject. We shall next consider the articular bones, as they are termed, and investigate them with respect to the ligaments and cartilages. The structure of the heart, and the distribution of the arteries which receive the blood from the heart, and the veins which convey it to that organ, will next be demonstrated. Under this head will be included the physiology and myology of the heart, and the particular structure of the auricles and ventricles, which become so efficient a part of the vascular system. This will lead us then to explain the structure of the lungs, their use, and great importance in respiration. We shall next point out the structure and physiology of the absorbents, whose office it is to regulate the functions of the arteries. This will be followed by a concise view of their distribution.

Having explained those circumstances that characterize the three orders of the vessels—the arteries, the veins and the absorbents, the subject of secretion will next offer itself for consideration; by secretion, being understood a power implanted in the vessels of separating from the blood a variety of matters for the support of the body, or as being subservient to some of its more important functions. This comprehends the structure of the glands.

The demonstration of the brain and its appendages the nerves, will place before our view the most interesting subject that can be presented to the consideration not only of the anatomist but of the philosopher, if indeed those two characters can be distinct, for every part of the human frame affords such ground for contemplation—such matter for astonishment and such proofs of the immensity of wisdom, that when regulated they form a lesson of the very highest moral tendency. The organs of sense will follow the demonstration of the nerves; those indeed will not form so essential a part of our consideration. The structure of the stomach and the alimentary canal, with the assisting kind of lacteals will lead us to explain the functions of digestion, by means of which the waste that is constantly going on is as constantly repaired.

Thus, Gentlemen, have I attempted to give you a brief outline of the plan that it is our intention to pursue in the anatomical part of our course, and to which we shall adhere as closely as it will be in our power. Occasional accident may, however, intervene, which may oblige us to deviate a little from the rule I have laid down; but you, Gentlemen, must be aware that in the science we are proceeding to investigate, there are prejudices to surmount, and difficulties to overcome of a peculiar nature, but which even the anatomist would not wish to have entirely removed.

We shall next proceed to the second division of our course; the operations of surgery. This will be prefaced by an explanation of the history of the diseases or accidents which may require operations; their peculiar systems and an enumeration of the anomalies that occasionally arise in every disease. The treatment that is proper to be pursued to avoid the necessity of an operation will be explained, and the operation itself will be performed in the manner in which it is recommended to be done by the most celebrated surgeons of the present day.

Lastly, we shall explain the after-treatment to be followed—a point of the greatest consequence to be attended to, and on which the success of the operation will in a great measure depend. This part of the course is undoubtedly to be regarded as of the highest importance, it being with many the professed object to which their views in the study of this science are ultimately directed. Before, however, I conclude this subject, I must beg leave to observe, that though we range the operations of surgery under a distinct head, this is by no means to be regarded as the only view that will be taken of the subject, for in the anatomical part of our course, there are many opportunities given us of treating on surgical cases, and this method relieves us from a sameness of description, and adds the charm of interest to that of variety.

It will naturally be expected that on an occasion like the present, I should not only point out the plan which is intended to be followed by the lecturer, but that I should also take this opportunity of explaining what will be the best method of study to be pursued by the learner. A little reflection will convince you, gentlemen that this is a task of some difficulty, for on this head there is a great difference of opinion. I must beg leave, therefore, to observe, that though I shall take the liberty of stating my sentiments on this subject, yet I offer them with some hesi-

tation. In the consideration of this question, there have been two points of debate particularly canvassed: one is whether it is advantageous to a student to take notes; the other, whether he shall consult anatomical treatises during his attendance on lectures. In respect to the first point of dispute, I shall venture to give a decided opinion. I think that every pupil should at least attend two courses of lectures before he attempts to take notes, or else the consequence will be, that he will lose the demonstrative part, which is certainly to a beginner the most important. I doubt, too, when gentlemen are in the habit of collecting observations made by a lecturer, whether it might not be done in a different manner to what is generally practised. I am inclined to think that during the time of the lecture, the whole attention should be directed to the subject under consideration, and that gentlemen should defer making any observations till the evening. This plan would, perhaps, at first, be attended with some difficulty, but it would beget a habit of reflection, and what is to a student of incalculable advantage, it would teach him the value of time. Besides, by comparing notes made in this way, the omissions of one student might be regarded by those of another, and by this means a little discussion would arise, which certainly would not in itself prove unprofitable.

With respect to the other matter of dispute, whether a pupil should read anatomical treatises, it appears to me that the answer to be given to that ought to depend on this circumstance,—the length of time that is devoted to the study of the science. If a gentleman is unfortunately so situated as to be unable to give any great attention to this branch of the profession, to him the consulting of such works is of service, and the memory, by these means, may be assisted. To others I should by no means recommend it; but I should advise the young beginner to rely entirely on his own unassisted powers.

The discussion of this subject naturally obliges me to regret the very insufficient time that is generally allotted to anatomical pursuits. It must be conceded that this science forms the very basis on which medicine rests, but more particularly surgery, and yet in general most students are content with the superficial view of it which the residence of a single winter in the metropolis affords; and even that short period of time is not confined solely to the study in question, but the attention is distracted by a multiplicity of other pursuits. That such is (or was) the state of medical education, no one can deny. That such ought to be the case no one, I presume, will be bold enough to assert.

With respect to anatomical plates, I have but little to remark, and indeed the observations I have already made applies equally to them. I think it is much better for a pupil not to consult them until he has made considerable progress in anatomy, which having attained, they may then be occasionally resorted to.

There is but one subject more to which I shall on this occasion take the liberty of alluding, though perhaps it does not strictly come under my present consideration, but I regard it of such high moment, that I trust I shall be pardoned for deviating a little out of my peculiar province—I mean *the utility of dissection*.

I cannot speak too forcibly on this subject. If I have mentioned the limited attendance of lectures as a subject of regret, how much more must I regret that so inconsiderable a portion of time is devoted to this most material part of education. The inquiries of most gentlemen are restricted to the examination of one, or at furthest two, subjects, and the dissection of the muscles and vessels of the two, (or one chiefly,) and that is too often the sole object of consideration. These are undoubtedly of the first importance to be attended to, but in so cursory an examination, how much must of necessity be left undone? This is not a matter of little moment, unless we mean to contend that pain is no evil, and that deformity is of little consequence, for we are to recollect that anatomy is studied with a view to perfect education, and that the happiness of many is to be confided to our care.

If, then, gentlemen, the study of this science involves in it such material considerations, I am certain that any appeal to your passions will be unnecessary; for when the understanding is convinced, the impression that is made is more permanent and durable. It is not then the impulse of the moment; every gentleman must feel the necessity of attention, and must be convinced, that upon his own diligence and his own application depends the progress he is to make. Reflection will suggest how highly his present studies ought to be appreciated, and will teach him that time misspent can never be recalled.

In respect of myself and that gentleman in whose name I have now the honour of addressing you, I trust you may rely on our exertions; and I hope I shall be credited as sincere when I assert, that your success in life will be the highest gratification we can feel, and the most noble remuneration you can offer!

MR. GRAINGER.

Theatre of Anatomy, Webb-street, Maze Pond.

GENTLEMEN,

WE are this day assembled to enter into an investigation, which is one of the most interesting and important that can engage the attention of the human mind. It is one of the most interesting, because there is nothing which so nearly concerns man as the knowledge of himself, and it is the office of anatomy to explain the curious structure, and of physiology the admirable functions of his corporeal frame.

It is one of the most important, because a knowledge of the structure and functions of the human body is absolutely indispensable to rational surgery and medicine; whatever, in other respects, may have been the advantages of his education, no man can be a good surgeon, no man can be a good physician, who is not well acquainted with anatomy, and who has not thoroughly studied the principles of physiology. The information, which it is the object of this course of lectures to communicate, is, therefore, absolutely essential to you, and without which you cannot advance a single step in the study or in the practice of your profession.

It is customary at the commencement of a course of lectures, to give a particular account of the rise and progress of the branch of science upon which we propose to treat. But such a detail is tedious, and occupies that time which might be much better employed in explaining particulars, which it is important for every student to know. We shall, therefore, content ourselves with merely adverting to a few of the most important circumstances connected with the history of anatomy. We shall next lay before you a short account of the structure and relative connexions of the several component parts of the human body.

We shall explain the system it is intended to adopt in the ensuing course, and enumerate the particular measures to be pursued for the attainment of an accurate knowledge of this useful art. It must, however, at once be acknowledged, that on many points we have little or no information to communicate, but we can with confidence assert, that by a strict adherence to the system about to be pointed out, you may become, without much difficulty, fully acquainted with the anatomy of the body, so far at least as it is at present known. For it has been justly observed, that "if we examine into the structure and functions of the body, we must not be surprised or disappointed if we meet with some parts whose uses we cannot make out, or with some of its operations which we cannot explain. We can see and comprehend that the whole bears the strongest characters of wisdom and ingenuity, but the imperfect senses and capacity of man cannot pretend to reach every part of a machine, which nothing less than the intelligence and power of the Supreme Being could contrive and execute.

I have noticed the custom of devoting an introductory lecture to an elaborate history of anatomy. Previously to the publication of Dictionaries of Science, it might have been necessary for a lecturer to collect from various authors, the history of the art he was about to teach. It was scarcely possible, that many of his auditors should have been able to collect for themselves, information diffused through a multitude of writers; at present it would be needless to occupy your time with a subject of this nature, since in any Cyclopædia you may read, under the article "Anatomy," all that is known of its history. Still, however, a few remarks may be proper. In the early ages of the world, as may be seen in those nations which at the present time are in a state of nature, man is too much engaged in procuring food for his daily sustenance to be able to make use of the latent faculties of his mind. Like the animals that range the forest he gorges himself when he has overtaken his prey, and like them he sleeps till the stimulus of hunger again rouses him to action. Till long after this savage state is passed; till from the operation of the various causes which brings man into society, and which, in a succession of ages, lead to its civilization, no progress could possibly have been made in the knowledge of the human frame. Hence, it is not till after the establishment of the Grecian republics that we hear of anatomy. The Egyptians, indeed, it is said, must have known something of this art from their custom of embalming the dead. But their great object was as hastily as possible (for the heat of the climate required that it should be done immediately) to tear out the contents of the different cavities, and to fill them with their spices and other antiseptic ingredients, and afterwards to envelope them in those coverings, in which at this day we see their mummies encased.

From such a process they could have gained no knowledge of anatomy. Among the Greeks, therefore, who made such

prodigious progress in the arts and sciences, the earliest traces of anatomy are found.

All is obscured till the time of Hippocrates, the father of physic. Well, indeed, may he be called the father of this science, for it appears that he first laid its foundation, by observing the forms and structure of animals, and, indeed, it is said, that under his auspices, the first anatomical dissection was made by his friend Democritus of Abdera. Hippocrates was born about 460 years before Christ.

A long period elapsed, after his time, before a school for the dissection of human bodies was established. At length, at Alexandria in Egypt, anatomists, in common with other men of science, were publicly supported. Among the first who studied, and, indeed, taught at Alexandria, were Erasistratus, and Herophilus. These anatomists are said, not only to have dissected some hundreds of dead bodies, but to have even examined those of living persons, that they might discover the hidden secrets of nature.

The greatest ornament of the Alexandrian school, was the immortal Galen, who proved, that much of what his predecessors had taught was erroneous. He first showed, that the arteries were blood vessels, and not air tubes, as, from their being found empty after death, they had always been considered till his time. He lived about 150 years after the Christian era.

Subseqnent to the time of Galen, the science of anatomy, and indeed, all other sciences, seem to have been almost lost, at least little of them can be traced for several centuries.

During those dark ages, the libraries of Rome and Athens were destroyed by the Goths and Vandals, and that of Alexandria itself, the most magnificent collection in the world, was burnt by the Saracens.

It appears that the Arabians must have retained some knowledge of anatomy, as it is quite certain, that the physicians of the west learnt almost all they knew from that people. During the whole of the above period, however, the doctrines of Galen were blindly adopted, and it was not till the sixteenth century that any progress was made in the study of anatomy. At this period, the baneful influence of ignorance and superstition which had been so long and so powerfully exerted to debase mankind, and to crush all intellectual pursuits, began to yield before the advance of knowledge and of science, which now, bursting from their restraints, dispelled the clouds which for ages had obscured the noblest faculties of the mind. Genius thus freed from its fetters, sent forth its sons to enlighten and to instruct mankind. Anatomy amply shared in the common benefit thus bestowed on the world, and many distinguished men now appeared.

Amongst these may be mentioned Fallopius and Eustachius in Italy, Sylvius in France, and particularly Vesalius in the Netherlands. Vesalius was the first anatomist after Galen who dissected human bodies extensively. He dared to question some of the opinions of his predecessors, whom he accused of having taken many of their dissections from animals. Galen was defended by Sylvius, Fallopius, Eustachius, and Columbus. To determine their disputes, they made appeals to the human body, and thus our art was greatly improved. This was indeed a splendid era in the history of anatomy, and many great discoveries were made. Anatomists had now got into the right track, and it was successfully persevered in till our illustrious countryman Harvey discovered the circulation of the blood, and published his work on that subject in 1628. It is, however, but justice to observe, that Harvey had attended the lectures of Fabricius ab Aqua Pendente, and that Fabricius discovered the existence of valves in the veins, and had published an account of them before the appearance of Harvey's work.

The anatomists of all European nations were stimulated by Harvey's success, and their industry and acuteness rapidly added to the knowledge of anatomy. About this time the lacteals, or absorbent vessels of the intestines, were discovered by Asellius, an Italian; and several years afterwards the lymphatics, or common absorbents of the body, were described by Rudbeck, a Swede, and afterwards by Bartholine, a Dane. Pecquet, in France, having previously pointed out the thoracic duct, the absorbent system was now rendered complete.

From this period discoveries followed each other in rapid succession, and a long list of illustrious names adorns the page of anatomical history, from Ruysch, Malpighi, and De Graaf, to Albinus, Cheselden, and Haller; from the two Hunters, Munro, and Hewson, to the no less distinguished men of the present day. In this brief sketch it is obvious that a multitude of names has been omitted, which are well worthy the remembrance of every one who admires this noble study.

I shall now, Gentlemen, rapidly describe the human body, and in doing so I shall, in part, avail myself of the excellent arrangement adopted by the late

Dr. Hunter. On reviewing the component parts of the body, the bones are the first objects to which our attention is directed; they form the outline, or framework, of that structure which is so complicated, and yet so admirably arranged, as to produce the most astonishing effects by causes apparently the most simple. The position and the connexion of the bones are such, that every variety of motion is effected with the most perfect ease, and so great is the wisdom of their arrangement, that the most complicated movements are daily and hourly performed without risking their displacement, or injury. Of the skill evinced in the connexion of the bones, we have a beautiful instance in the formation of the spinal column: a canal runs throughout the spine for the transmission of the medulla spinalis, supplying nerves to the greater part of the body. Should this nervous mass be pressed on, palsy of all parts below the injury would be the immediate consequence, and yet it is necessary that the bony column containing this important structure should move very extensively. At first sight it would appear that the motions of the spine would necessarily compress the nervous cord contained within it; this, however, we know is not the case; the spine, instead of being formed of a single bone, is constituted of a great number, which are so placed as to admit of little movement between any two of them, although taken collectively their motion is very extensive. By this admirable arrangement the spinal cord is defended from injury, whilst the motions of the vertebral column are far from being confined.

Although the firmness an unyielding nature of the bones are esse al for preserving the form and necessary for the production of the varied motions of the body, yet such movements would be attended with incessant shocks, were not this prevented by the interposition of some more yielding substance. To remove this difficulty the ends of the bones are covered with cartilage, a substance so highly elastic and so abundantly supplied that the body moves as it were upon springs, effectually defended from concussion and injury. We find that cartilage decreases in proportion to the age of the subject. In the fœtus it almost entirely occupies the place of bone; in age, on the contrary, its quantity is much diminished. The existence of this substance in the fœtus is really necessary to the birth of the child, which could not pass through the outlet of the maternal pelvis, if the bones were then complete. In age the absence of cartilage is evinced by the loss of that elasticity in the motions of the body, which characterises the early and the middle periods of life.

The movements of the bones on each other are greatly facilitated from their cartilaginous extremities being lubricated by synovia, a fluid admirably adapted for the purpose, and principally secreted within the different joints. In order to regulate the extent of motion between the bones, and to give firmness and support to their different articulations, numerous cords or ligaments are formed passing from bone to bone. These ligaments are so remarkably strong, that the bones themselves are more easily broken: of this we have instance in dislocations of the ancle, the principal ligaments are frequently uninjured; the bones, on the contrary, are almost invariably fractured. By the assistance of ligaments, most of the joints are completed, which, were they deficient, would be constantly exposed to displacement. Indeed it would be almost impossible by any arrangement of bone to allow those movements which are thus rendered easy and safe. This machine, composed of bones and ligaments, is well adapted for motion, but incapable of moving itself, hence the necessity of muscles. Muscles consist of bundles of fibres, variously arranged, possessing in the dead body but a trivial degree of strength, whilst in the living their power is immense. This is evinced in the well known case of Damian, who was executed for attempting to assassinate Louis 15th. Four young horses were fixed to his legs and arms, and were urged to their utmost strength, in order to separate his limbs. These efforts, which were continued for a space of 50 minutes, were unable to overcome the resistance of the muscles, and it was not until these had been divided by the executioners, that the horrid sentence of dismemberment could be carried into effect. The muscles are the active agents in the production of the varied movements of the body—by their means we are endued with the power of moving from place to place, and have intercourse with a variety of objects; flying from such as are disagreeable or dangerous, or pursuing such as are pleasing or useful to us.

As the motions of the body would be most materially impeded if the various muscles were inserted in masses into the bones, tendons have been formed, to which the muscles are attached. These facilitate their employment, and prevent the necessity which would otherwise exist of the bones being greatly extended.

Tendons are inelastic and strong, but

their strength is occasionally insufficient to resist the contraction of the muscles connected with them; thus the tendo achilles, the strongest tendon in the body, is occasionally ruptured by the violent action of the gastrocnemius. In order that the mind may set in action this structure, and, indeed, superintend the whole fabric, it is necessary that a thinking immaterial agent should be provided with a place of immediate residence, and accordingly the brain is formed. As we are destined to hold correspondence with all the material beings that surround us, we must be supplied with organs fitted to receive the different kinds of impressions they will make. For this purpose we are provided with the organs of sense; the eye is adapted to light; the ear to sound; the nose to smell; the mouth to taste; the skin to touch. But as the brain is the seat or source of sensation and volition, it is necessary to be furnished with media of communication between that viscus and the external senses, to give us information of the impressions made upon them. Hence we are supplied with nerves. An impression received on any part of the body, even the most remote, is propagated by the nerves to the brain, where cognizance being taken of it, sensation is produced. Again, a command emanating from the brain is transmitted along the nervous cords to the parts requisite to be put into motion, when the influence is immediately acknowledged. The fact that these properties reside in the brain is almost self-evident. By directing my will to the muscles moving the fore-arm, I readily bend it on the upper arm, because there is a direct communication with the brain by means of the nerves. If these be divided, I might will my arm to move, but it would continue motionless. This proves that volition is connected with the brain. Again, if the nerves passing to a limb be divided, the most severe injury may be inflicted on it, yet no pain will be experienced, because the communication with the sensorium has been cut off. In compression of the brain, coma or loss of sensation and voluntary motion is produced; notwithstanding the involuntary functions proceed in consequence of the nerves of organic life possessing some inherent and apparently independent power. By the assistance of our nerves, we are warned of those bodies which are noxious to us, and have an opportunity of defending ourselves from injury. They are the source of all our corporeal enjoyment, and the powers even of the mind seem extensively influenced by their actions. In this place, perhaps, I may be allowed to advert to the important additions which have recently been made to our stock of knowledge relative to the functions of the nervous system. There is a satisfaction in the reflection, in which we may be permitted to indulge, that the suggestions which have led to most of the late discoveries in this obscure and difficult subject, were originally made by our own countrymen.

I shall, in the first instance, direct your attention to that division which has been adopted with respect to the nerves, by which they are referred to two great classes. Those of the first form, what are termed nerves of organic life; those of the second, the nerves of animal life. The honour of this most important distinction has usually been attributed to Bichat, but he has no claim to it, as will be at once evident from the facts I am now about to mention.

In the year 1761, Dr. James Johnston, of Worcester, published an account of the difference he had observed between the functions of the nerves of voluntary and involuntary parts. This distinction was not merely the result of theory, it was the influence he had deduced from some very curious and highly interesting experiments made by himself; our time will not allow me at present to describe them. They are very important, and the great inference drawn from them has been established by subsequent investigations. The conclusion to which this distinguished individual arrived was, that the ganglia interrupted the influence of the will, so that the organs to which the ganglionic nerves are distributed, as the heart, the intestines and other viscera, have their actions rendered uniformly involuntary, and independent of the brain and spinal marrow. Thus he found, that on dividing the spinal cord, and then irritating the part below the section, that the voluntary muscles became convulsed, while the action of the heart remained unaltered, arising from the interposition of the ganglia, which he supposed to check as it were the power of volition.

The paper containing the statement of this doctrine was read before the Royal Society, and was published in their Transactions, in the year 1764. At the same time, the author corresponded with Dr. Whytt and Baron Haller on the subject. Haller appears to have made some objections, which, however, were afterwards removed. Ten years after this period, Dr. Johnston published his opinions in a separate pamphlet, which was favourably received, and very extensively circulated. It was translated into the French lan-

guage by Tissot, and into the German by Dr. Kolpin; and Cassimere, in a work published at Manheim, in the same year, is stated by Dr. Johnston to have adopted his whole system. I have mentioned these circumstances (for a knowledge of which I am indebted to the son of this distinguished physiologist) to show that the channels by which the French anatomists might have seen this work were easy and direct. The General Anatomy, published by Bichat, did not appear for several years after this period. It is most improbable that he should have been ignorant of the earlier inquiries of Johnstone, as they had been translated into French by so distinguished a writer as Tissot. This consideration renders it difficult to allow the correctness of the following passage, extracted from the "Anatomie Generale:" "Anatomists *till now* have considered the nervous system in an uniform manner, but, however, little we reflect on the forms, the distribution, the texture, or the properties, and uses of the divers ramifications of which it is composed, it is easily perceived that they should be referred to two general systems, essentially distinct from each other, and having for their principal centres, the one the brain, and its dependencies; the other the ganglions. The first apparatus belongs especially to animal life; on the one hand, it is the agent which transmits to the brain the external impressions calculated to produce sensations; on the other, it serves to convey the volitions of that organ, which are performed by the voluntary muscles to which it resorts."

"The second, almost invariably distributed to the organs of digestion, of circulation, respiration, and the secretions, depends in a more particular manner upon organic life, where it acts a more obscure part than that of the preceding." This appears to me to be merely a restatement, in other language, of that doctrine, the credit of which is due to Dr. Johnston. There are some objections to this theory, which, however, do not seem to affect its general truth. Thus it is known that the nervus vagus is distributed to the stomach, which is an involuntary organ. Again, in the lower orders of animals, according to Beclard and other distinguished physiologists, there is only *one nervous system*, which alike supplies the structures which perform the animal and organic, or, as they are termed, the vegetative functions.

We shall now shortly allude to the origin and functions of the spinal nerves. Many years ago, Mr. Charles Bell noticed the fact of the posterior bundle of the nerves proceeding from the medulla spinalis conveying sensation, and of the anterior fasciculus transmitting motion. In a work which was, I believe, circulated among his private friends, Mr. Bell remarked—"On laying bare the roots of the spinal nerves, I found that I could cut across the fasciculus of nerves, which took its origin from the posterior portion of the spinal marrow, without convulsing the muscles of the back, but on touching the anterior fasciculus with the point of the knife those muscles were immediately convulsed." In a late publication of Dr. Cooke on palsy, Mr. Bell observes, "the nerves of sensation and of motion are bound together in the same membranes for the convenience of distribution, but there is reason to conclude, that they are distinct throughout their whole course, and as distinct at their origin as in their final distribution to the skin and muscles."

Since these experiments, the subject has been investigated in France, particularly by Magendie, who has much more fully examined into it than had previously been done in this country.—Magendie states, as the results of his experiments, that on dividing the posterior origin of the spinal nerves, motion remained, but that sensation was destroyed, whilst by dividing the anterior bundle, an effect directly the reverse was produced. It has been attempted to give to Magendie the merit due to the first discovery of this theory. This physiologist, however, with a liberality worthy of imitation, has done justice to the claims of Mr Bell, in a late number of his Physiological Journal.

From the confirmation which those doctrines have lately received, we cannot avoid acknowledging their truth.

This discovery, as to the functions of the spinal nerves, is not the only grounds on which Mr. Bell deserves our thanks. He has at different periods published observations on other parts of the system. Those various papers with additions, are now given to the world in a connected form. The volume containing them is entitled "An exposition of the Natural System of the Nerves of the Human Body." I cannot in too strong terms recommend it to your careful attention, for whether we view it as removing much of the obscurity which has hitherto enveloped the subject of which it treats, or as containing a system of clear reasoning and legitimate deduction, it equally commands our approbation. Time only permits me at present cursorily to notice that part of the work connected with respiration. The author proves from an extended and minute examination, that

in addition to the nerves of peculiar and common sensation; of voluntary motion, and of the ganglionic system, there is an important class which is for the purpose of associating and combining very numerous muscles in the varied actions of respiration. They differ from those of the spinal marrow, in having single roots or origins, and in being irregular in their distribution. They have been aptly called the superadded or the irregular nerves. They have thus been denominated because they are found to be superadded in proportion as we advance in the animal creation, and thus find additional organs till we observe them most complicated in man.

I have, perhaps, committed an injustice, in so imperfectly noticing this admirable arrangement, but I could not allow this opportunity to pass, without offering my tribute of respect to its ingenious author.

I shall here state to you what appears to be the most correct classification; as far as our knowledge serves us at present, I do not assert that it is unexceptionable, as some part of what I have stated still rests on hypothesis; but I think it will be found in accordance with the generally received opinions. In the first place, then, we find that there are the spinal nerves, and the fifth of the cerebral resembling them, which are for the purposes of the common sensation of the body, and for motion or acts of volition. These form what have been designated the symmetrical system, being regular in their distribution and common to all animals from the worm up to man. The existence of this class in the lower orders of animals has been denied by distinguished anatomists. Thus Beclard states that in the invertebrated creatures, there is only a ganglionic set.

Next we may mention the nerves of the peculiar sensations, consisting of those of vision, of hearing and of smelling. Then should be enumerated those connected with respiration, constituting the irregular or superadded system.

These four classes appertain more especially to animal life.

Lastly, there are the important nerves forming the ganglionic system, and which are subservient to the functions of generation, digestion, circulation, secretion, and nutrition. This last named class, belonging to the involuntary organs, forms the nerves of organic life, the functions of which are common to animals and plants, or, in other words, to all organised beings.

Numerous inquiries have been made relative to the functions of the different parts of the brain, but apparently with little success. The influences of this important organ are so mysterious, and so far removed from the field of human observation, that we know little or nothing respecting them. Those who are interested in this branch of physiology, will find the experiments and observations of Fleurens, Magendie, Spurzheim, Gall, and others very interesting. The various parts of the body are enveloped in an elastic cellular membrane, which has been properly termed the universal connecting medium, as it is found in every variety of situation, in every species of structure. In addition to connecting the different parts together, and extensively contributing to their formation, it serves the important office of a reservoir of nourishment, a considerable portion of its cells being loaded with fat, which is absorbed under certain circumstances, and lastly, being condensed upon the surface, the cellular membrane is believed to form the skin or outer covering of the body. As we are destined for society and intercourse with each other, we must be endued with the power of expressing and communicating our thoughts, and accordingly we possess the organs and faculties of speech, by which we can express ourselves with amazing facility. This grand prerogative, granted alone to man, is the principal cause of his mental superiority over all other created beings. By means of this, powerfully assisted by the art of printing, we possess the accumulated knowledge of ages, and thus are enabled to develope with incalculable advantage those latent intellectual faculties which so nobly distinguish our species.

I have now described an animal body formed of bones, of cords or ligaments tying the bones to each other; of muscles or moving powers; of a brain; of nerves transmitting impressions to the brain, and carrying commands from the brain; of a cellular or connecting medium, and the whole surrounded and defended by the skin. This structure would appear complete, but we have not yet provided for its support and duration, so that in a short time it would fall into decay and perish. It is from the blood that the nourishment of the body is derived, and upon it the reproduction of any part which may have been destroyed equally depends. This fluid is derived from the nutritious part of our food prepared by a peculiar process in the alimentary canal.

The blood, impelled by the heart, is transmitted by the arteries, which greatly assist in the circulation, to the most minute parts of the body, building up the several structures and keeping them in a

state of health. The superabundant quantity is returned to the heart by the several veins, but as a large portion of it is expended in preserving the healthy state of the body, in supporting the actions of the various organs, and in performing the numerous secretions, it is necessary that a constant supply should be provided, and this is derived in abundance both from animal and vegetable matter.

The food taken into the mouth is broken down by the teeth, and is mixed with the saliva. In this state it passes by the gullet, or œsophagus, into the stomach, where it is acted on by the gastric juice, and is there formed into a pulpy homogeneous substance called chyme. The food thus digested passes from the stomach into the intestines, where it is separated by the bile and other animal fluids into two parts; the one called the chyle is the nutritious or recrementitious portion, which closely resembles the blood, excepting in colour; the other part is the useless or excrementitious.

The duodenum, or first portion of the small intestine, must be considered not so much as an intestine as a secondary stomach. Its function is most important, and, like the stomach, the duodenum performs a change on the alimentary substance, for here the separation of the nutritious from the excrementitious part of the food takes place. Thus is completed the digestion commenced in the stomach. From the intestines, particularly from the small, the chyle is taken up by the lacteals, or absorbents, and is conveyed into a vessel called the thoracic duct, where it becomes mixed with various other fluids brought from every part of the body. The contents of this duct are emptied into the veins on the left side of the neck, where, uniting with the venous blood which has been changed during the circulation, they pass to the heart. From this account it will appear, that in addition to the nutritious part of the food carried into the circulating system, much heterogeneous matter is absorbed by the lymphatics, and is mixed with the blood. The useless or injurious parts are removed by the action of the lungs, materially assisted by that of the skin and kidneys. The venous blood, united with the contents of the absorbents, is returned from all parts of the body to the right side of the heart, from whence it is distributed throughout the lungs, being of a dark colour and loaded with carbon.

The lungs are principally composed of a number of cells, which are filled with atmospheric air from the branches of the windpipe. These cells are so delicate, that although they will not suffer so gross a fluid as the blood to pass through their parietes, yet it is believed that the air does so, and actually comes in contact with the blood. The carbon of the venous blood, according to the common opinion, unites with the oxygen of the atmospheric air, and passes off in the state of carbonic acid gas, whilst the blood, now become of a bright scarlet colour, and again fitted for the purposes of the circulation, passes to the left side of the heart, and is from thence propelled to every part of the body.

Various ingenious theories have been advanced to explain the phenomena of respiration, but the exact truth is probably still unknown. There is, however, no doubt that the venous blood gets rid of its carbon in the lungs, so that from a healthy adult, it is positively ascertained that no less than eleven ounces of charcoal are expired or carried out of the system in twenty-four hours.

From the general view we have taken of the human body, we perceive that an animal is formed and furnished, not only with the powers which are necessary for its immediate existence, but also endued with the capability of protracting that existence to an indefinite period. The duration of life, however *physically* considered, is limited. For as the body is nourished, it grows and is raised up to its full strength and perfection, so in common with all material beings, it soon begins to decay, and at no distant period finally perishes.

Hence we see a scheme of renovation Accordingly Providence, in his wisdom to perpetuate as well as to preserve his work, besides giving a strong appetite for life and self-preservation, has made male and female, and given them such organs and passions as will secure the propagation of the species.

I shall conclude this brief description of the human frame with an extract from the Supplemental History of Man, contained in the excellent translation of Cuvier's Animal Kingdom, now publishing. After comparing the unprotected state of man, in a physical point of view, with that of other animals, the writer thus proceeds—"But Nature has nevertheless bestowed on him one gift much more than equivalent to all that was denied him—she endowed him with inventive genius, which, stimulated to exertion by his varied wants, soon amply supplied them all, and eventually raised him to his measureless superiority over the rest of created beings. To the perfectibility of man's intellect no definite limits can be assigned; he has reduced, by means of his intelligence, most animals to doci-

lity and servitude, and such as their native ferocity render incapable of utility and dangerous to his repose, he has banished to the 'howling wilderness.' The surface of the earth attests his industry and intelligence, and Nature herself is delighted to obey him. He has drained the unwholesome marsh, turned the course of rivers, banked out the encroaching sea, and cleared the umbrageous forest with an energy neither tired by labour nor disheartened by difficulty; he has succeeded in producing abundance, comfort, utility, and pleasure, the arts which adorn social life and the blessings which render it valuable. He has scrutinised the mysterious relations of time and space—ascertained the courses and revolutions of the heavenly bodies, and pursued his path with accuracy over the trackless ocean; thus establishing a communication between the remotest nations, and extending far and wide the discoveries of science and the improvements of civilization. When we compare the present state of human advancement with the rude efforts of society in its earlier stages, we are lost in astonishment; and when we recollect the fact, that the human species is still advancing, probably even at an increased ratio of rapidity—that new discoveries, new combinations, and new improvements are daily, nay hourly, making—though we know full well that the human mind is finite, yet who shall venture to fix a boundary beyond which man shall not pass in his gigantic progress to intellectual perfection."

Well may the immortal Shakspeare then exclaim, "What a piece of work is man! How noble in reason, how infinite in faculties! In form and moving how express and admirable! In action how like an angel! In apprehension how like a God! The beauty of the world!—the paragon of animals!"

I shall now, Gentlemen, proceed to explain the particulars of the system which I intend to adopt in the ensuing course. I do not propose to confine myself to the mere anatomical description of the various parts of the body, but shall introduce such surgical and physiological remarks as may appear of importance, when connected with the parts under consideration. In treating of physiology, some difficulty occurs as to the best method to be pursued, as the several organs have such a mutual dependence on each other that they cannot well be explained or understood separately. I shall, however, in general, describe the functions of the several organs immediately after pointing out their structure. We shall begin the course with an account of the general properties and uses of the blood, as from this fluid are originally formed the various parts of the body.

We shall next take a general view of the osseous structure, and then the individual bones will be described, commencing with those of the trunk and extremities, as I am desirous that those gentlemen who honour me with their attendance, should dissect as early as possible, and it is absolutely requisite to obtain an accurate knowledge of the bones before studying the muscles. The various connexions of the bones and their several articulations will be particularly considered, and all circumstances of importance clearly defined. The general treatment and symptoms of fractures will also be carefully pointed out. After the bones, the ligaments will be treated of. Their situation and uses will be described, and at this period of the course the various dislocations with their diagnostic marks, and the mode of treatment, will be spoken of.

I cannot refrain from expressing my regret that the close examination of the ligaments, and the structure of the important joints with which they are so connected, has been so much neglected; after the muscles, vessels, &c. have been carefully dissected, it is a frequent practice to throw away the limb, leaving untouched those parts which are of the most essential consequence. It has been a matter of common observation, and unfortunately the proceedings in our courts of justice too frequently confirm it, that accidents connected with joints, are those in which the most glaring examples of ignorance and incapacity has been evinced on the part of the surgeon, and where the greatest misery has resulted to the patient. These lamentable effects may probably have arisen from the injurious custom to which I have alluded. For if we consider the frequent obscurity of the symptoms attending these accidents—the difficulty which has occasionally baffled the skill of the first surgeons, of distinguishing between displacement of bones and fracture of their articular extremities—we shall no longer be surprised, if men who have neglected this important branch of anatomy are often unable to detect the precise nature of the injury. If this, however, be not done, and the proper treatment be not adopted, irretrievable mischief will most generally be the consequence. Such being the importance of the joints and of the injuries to which they are obnoxious, the thanks of the profession, nay more of the public, are fully due to the able author, who in his splendid work, lately published, has given

as such ample and clear details, by means of which we may be guarded from error. Next to the ligaments we shall proceed to the muscles. It cannot be stated in too strong a manner how absolutely necessary it is to become acquainted with their situation and connexions. For without this knowledge, it is impossible to understand the situation and course of the most important blood-vessels and nerves. I repeat that your future success in obtaining a complete knowledge of anatomy will very materially depend on a previous acquaintance with the processes and connexions of the bones, and the situation and attachment of the muscles.

Next in order we shall point out to you the viscera of the abdomen and chest. Then will be traced the origins and ramifications of the blood vessels.

The necessity of an intimate knowledge of these must be too obvious to require any comment. Even the most trivial operation in surgery cannot with safety be performed without such information. The absorbents will next be considered, and, lastly, the nervous system. The eye, the ear, the mouth, &c. will be described at those periods which are most convenient.

The principal operations and the method of performing them will be shown during the season. I shall endeavour, as far as possible, to follow the plan here pointed out; but in a course of lectures it must be apparent that this regular series cannot always be strictly observed.

It is, I trust, almost needless to say, that I shall interest myself in the progress of each individual, and with a view of promoting it, I shall devote several hours daily to the dissecting room. It is here that the greatest difficulties are experienced by pupils, and, consequently, where assistance is most required. In order to facilitate as much as possible the pursuits of those gentlemen who honour me with their attendance, my friend, Mr. Hutchinson, will be happy to afford all the aid which may be necessary to second their own exertions, and from his abilities and known assiduity, I have no doubt that aid will be efficient.

In addition to the regular series of lectures, it is my intention that occasional demonstrations should be delivered on those parts which, either from their great practical importance, or from their complexity, require further explanation. I also propose that an examination should be held weekly, which will afford an opportunity of inquiring into those parts which have been previously dissected. Examinations have been objected to by some as substituting conversation for actual dissection. If such were really the case, no one would be more ready than myself to condemn so injurious a custom. But if a pupil is questioned only on what he *has dissected*, and this is a rule from which I have never deviated, it appears that considerable advantage will be gained, as an opportunity is given of removing misconceptions, and likewise of explaining any obscure points. This familiar mode of communication conveys confidence to the student, and a facility of explaining himself, which hereafter may be of essential consequence. It frequently happens, that men possessing profound knowledge are incapable of conveying that knowledge to others, and thus to a certain extent it loses its value. I therefore contend, that we should endeavour not only to teach anatomy, but also to enable the student to make such use of it as will be most advantageous to himself and others.

It is hoped, that by this manner of proceeding, a favourable opportunity will be presented to those desirous of sedulously attending to the study of anatomy, and that by care they may obtain that indispensable acquaintance with it, which will enable them to enter on the arduous duties of their profession with a proper dependance on themselves. This knowledge will give them a confidence when called upon to operate under the most trying and difficult circumstances, in which it would be in vain to seek for assistance from any other source.

By regularly attending the lectures, by paying a particular attention to your dissections, you will find that all difficulties will vanish, and that a pursuit which at first may appear dull and even disgusting, will soon become in the highest degree interesting. For what can afford more pleasure to the mind of him who, desirous of unravelling the wonders of the creation, eagerly engages in the investigation of its noblest work. This study, so calculated to raise our thoughts from nature to nature's God, will also bring conviction to the most sceptical of the existence of that superintending power in whom we "live, and move, and have our being."

Anatomy, which, like a beacon, guides the surgeon in his course, and warns him from those dangers by which he is surrounded, is still more interesting, from its connexion with physiology. So fascinating, indeed, is this latter science, that I consider I am not overstepping my duty in cautioning you not to allow it to seduce you from the less pleasing, though no less important study of the structure of the body. By some weak and uninformed persons, it has been asserted, that a sufficient knowledge for a surgeon and

a physiologist might be obtained from books. This is an error so pregnant with evil to the safety and welfare of mankind, that it cannot be too forcibly and publicly contradicted. The ignorant and the indolent may seize this as an excuse for their own deficiency, but let them beware of the effects of such disgraceful conduct. The man who engages in the practice of his profession, having obtained his anatomy from books alone, if such a knowledge can be called anatomy, has the mere semblance of what he does not possess. He will find, from painful experience, that by his culpable neglect of a most imperious duty, he has sacrificed his own reputation, and has increased that misery he might otherwise have alleviated. Thus strongly impressed with the importance of frequent and repeated dissection, I shall take care that you are well supplied with subjects. I cannot allow this opportunity to escape, without congratulating you and myself, that hitherto my exertions in this respect have met with the most decided success. I may without hesitation affirm, that the pupils of this school have rarely experienced any check in their anatomical pursuits, but, on the contrary, that they have always been provided with an ample supply even at those periods at which it was most difficult to procure bodies. For a confirmation of what I have stated, I can with confidence appeal to my former friends and pupils.

And here I cannot refrain from expressing my indignation, that lecturers on anatomy should be compelled to resort to those means of which, at present, they must avail themselves in order to render their schools efficient. It is much to be regretted, that the odium which in this country is attached to all anatomical pursuits, is not confined to those who, from their ignorance, cannot perceive the beneficial effects which will be derived from the proceedings they, from mistaken humanity, so strongly condemn. But that this cloud of prejudice should extend to those who, from their rank and attainments, should be above its influence, is not only a matter for surprise, but for the severest reprobation. It must proceed from some strange perversion of intellect, that men so enlightened on other points should obstinately entertain those illiberal ideas, of which we may so justly complain. No individual of information ventures to deny the necessity of a complete knowledge of anatomy, and yet none are so forward in condemning its absence as those who withhold from us the only means of acquiring it. If these feelings were prevalent among the lower orders alone, however much we might lament the mischievous effects they would produce, we could only pity the ignorance from which they proceeded. But when we find that this false philanthropy extends itself to more elevated ranks—when we see the seat of justice itself polluted by popular passion, in restraining which its true dignity would be best consulted—when the public press, with some honourable exceptions, instead of checking this mistaken zeal of the mob, is foremost to inflame it against this most useful of sciences; when its teachers and professors are held up to public execration as being devoid of the common feelings of our nature—it becomes an act of duty, nay of self-defence, to repel such base calumnies, and to refute the senseless clamour by an appeal to reason. A strong impression of the injustice which is al most daily committed, has, perhaps, induced me to express myself in too severe language, but an ample apology will be found in the recollection of the scurrilous abuse to which we have too long silently submitted.

From what I have stated, I trust it will not be supposed that I stand forward as a defender of that violation of the tomb, which is calculated to produce the greatest horror and disgust—I only condemn the prejudice which is the cause of it, and which prevents the adoption of those means by which it would be entirely removed.

My friend Dr. Southwood Smith has lately published some powerful facts and observations, which are calculated to do much good. It is to be hoped that this appeal to the understanding of the public will not be void of utility, and that they may at length be induced to believe that these proceedings, which have been so unwarrantably censured, are designed not for our gratification but for their advantage. The most important of the measures there recommended, are that the bodies of all felons dying in prison or other places of confinement, and of those who die either in hospitals or in workhouses, throughout the kingdom, *unclaimed by relatives*, be given up for the purpose of dissection. By those means it seems probable that a sufficient supply would be procured; no outrage would be committed on the feelings of any individual, or of any classes; and the sanctuary of the grave, which has been in all ages and in all nations so venerated, would be effectually preserved.

It gives me pleasure to inform you, that there is every probability of this matter being speedily brought before the legislature; and although but little can be ex-

pected at present, still we may hope much from the mere discussion of the merits of the question. Perhaps we may yet see some plan adopted, which, whilst it spares those feelings we all so fondly cherish, will at the same time afford to the rising generation such opportunities of pursuing the study of anatomy as will best enable them to discharge their duties with satisfaction to themselves and with incalculable benefit to the community. From all that has been said, you will perceive that your great object must be carefully and minutely to trace every portion of the human body. Be not satisfied with what the indolent will tell you, that a practical surgeon only wants a general knowledge of anatomy. Be assured that you will never find your anatomical attainments too minute, but that in the various modifications of disease, whether medical or surgical, which will be presented to your view, you will have increasing calls upon it, and that in proportion as your information is extensive and accurate, so will your practice be advantageous and successful.

Allow me then again to enforce the necessity of increasing industry. Let no plausible sophistry damp your ardour; let no pleasure mislead, no fears deter you. It is not merely necessary that you should attentively study anatomy before you venture on the practice of your profession—it will be absolutely criminal in you to neglect this important duty But if you faithfully perform it, you will derive great and increasing pleasure from unravelling the wonderful structure of our frame. To those devoted to philosophical pursuits, to one fond of observing the principles of hydraulics, of mechanics, of optics, what a field is here disclosed! If the mere mechanical formation be considered, let the mechanician look at the joint of the elbow; let him observe how the muscle called the biceps arises, how numerous are its fibres, how concentrated they become before they are condensed, as it were, into a tendon, to move the fore-arm! Let him pause and consider how it could be possible to continue any machine capable of raising against such leverage, without an enormous accumulation of matter, a weight thus appended to its extremity. If you require an illustration of the laws of optics, you will find in the human eye the perfection of all that the most skilful opticians could hope to effect. They, when their contrivances are most successful, merely imitate the human eye, and the completeness of their success depends on the accuracy with which they copy its structure.

I have thus attempted to hold out to you an inducement to study anatomy and physiology, if it be merely to make yourselves acquainted with the most entertaining of sciences. Although so much has been done by our great predecessors, an ample field remains unexplored before us. The uses of the thyroid gland and of the spleen are entirely unknown, and even those of the liver and pancreas are but very superficially understood.

The wonderful principle of muscular contraction, the hitherto inexpressible power of volition, are perfect mysteries to us. Here indeed is sufficient inducement for perseverance, exclusive of the imperious call upon you as medical and surgical practitioners. I feel perfectly assured then, that on your part, you will not be wanting, but that you will devote your time with unwearied energy to attain that which is the very basis and foundation of all surgical knowledge; for as well may an instrument of destruction be trusted in the possession of a maniac as a knife in the hands of a surgeon ignorant of anatomy.

MR. SLEIGH.

Theatre of Anatomy Chapel street, Grosvenor-square.

GENTLEMEN,

I HAVE made it a practice hitherto, in my Introductory Lecture, to deviate in some degree from the tenor of the generality of prefatory dissertations to Anatomical and Surgical Courses; therefore, instead of proceeding to entertain you with a history of the healing art, or of the many celebrated men who have flourished in and adorned our profession, since the days of HIPPOCRATES or GALEN, I shall endeavour to collect, within as narrow a compass as possible, a few remarks upon the various conditions of matter, the general laws observed by nature, errors that you are to avoid, and departments to which you are particularly to direct your attention, thus adducing a few important facts, according to which your future studies may be regulated.

When I reflect upon the subject to which I shall this day have the pleasure of directing your attention, I feel myself at a loss where to begin; its magnitude—its importance—and its unfathomable mines, almost deter me from attempting to draw even a superficial view of it. Of all the liberal professions, and indeed I may say of all the literary pursuits of man, there

is not one which is so intimately connected with, and depends so much upon, all the laws of nature, as the healing art—and this so much so, that it is utterly impossible for you to be a master of it, and ignorant of the laws which govern the universe. The particular sciences with which our profession is connected, may be arranged under two heads, the fundamental and the auxiliary: under the former head may be placed Anatomy, Physiology, Pathology, and Materia Medica; under the latter, Chemistry, Botany, Mechanics, Hydraulics, in fact every branch of Natural Philosophy. But let not this extensive connexion frighten or deter you from undertaking the noble task of learning *how* to assuage the sufferings of your fellow-creatures; and to encourage you in the ardent and serious pursuit after this most important science, permit me to remark, that there is nothing more calculated to crown with enjoyment and satisfaction him who in right earnest investigates it. Great discoveries have been effected by the telescope, which enables man to become acquainted with those masses of matter, or orbs, that traverse in space, observing the mandates of their Omnipotent Creator; and wonderful things have been brought to light through the means of the microscope, which has made us acquainted with those atoms of living matter, that appeared destined to escape the observations of man; but neither the telescope nor the microscope has led to such beneficial results as the simple *scalpel!* This instrument has enabled us to become acquainted with the various parts of the human body, both in a healthy and morbid condition; and the effects of this are, that millions of the human race have been snatched from otherwise inevitable destruction—millions have had the most painful diseases removed—and millions are this moment alive, who would have long since been mouldering in their parent soil. The scalpel has done all this; therefore I aver that it is much more valuable to mankind than either the telescope or the microscope, notwithstanding the encomiums that have frequently been lavished on these instruments. Although we find, in the wonderful works of the Creator, a vast variety of phenomena; so much so, that viewing them in the aggregate, we might imagine that an acquaintance with them is far beyond the finite mind of man, and hence that attempting to learn them is a useless loss of time; yet, gentlemen, let me inform you that nature rejoices in producing a variety of effects from a few simple causes; and this not only in the various departments of Natural Philosophy, but also in the Animal Economy. In the former, by the simple laws of gravity and attraction, how innumerable are the effects produced even upon this earth, independently of the myriads of orbs, each producing its peculiar effects in taking their destined circuits! And in the latter, how many important functions are performed in the animal machine, by the simple circulation of the blood! Before we enter then more fully into the consideration of the animal functions, I shall beg leave to call your attention, for a short time, in a very laconic manner, to a description of the various conditions of matter. If we take a general view of this great planet on which we live, of the great domain of Nature, we find matter existing under various forms, and exhibiting various phenomena. These various conditions of matter may be simply divided into two great classes—inorganic and organic matter; or, in other words, into that which possesses life, and into that which is destitute of it. These two classes may each be sub-divided, the former into simple and compound substances; the latter into the vegetable and animal kingdoms. I shall now endeavour to give you a few, out of the many, circumstances that have been mentioned by authors for the purpose of drawing a line of demarcation between each of these classes. In the first place, there is a remarkable homogeneousness in the nature of all inorganic matter, and all the particles or molecules which constitute each body, are perfectly independent of one another; it is quite the contrary in organic matter, each particle being linked to the other by a powerful bond of union. And while a piece of inorganic matter may be broken into ever so small a size, yet each atom will be an integrant particle resembling the whole body in its composition, and differing from it only in its size or shape. But each particle of an organic body will differ not merely in its size or shape from that of which it constituted a part, but it will be found to differ considerably in its composition and nature. The absolute necessity of a union of liquids and solids in all organised or living matter constitutes a very remarkable difference between it and inorganic matter. In living bodies we find the liquids conveying to the solids those nutritious principles which are necessary for their sustenance, reparation, and development; while the latter are as constantly acting on the former, and separating from them those various fluids which are to assist in, and promote, the numerous functions in the machine, whether in the animal or vegetable kingdom. Another circumstance no less remarkable

in, that all matter endowed with life has a natural determinate commencement or birth, and has as natural or spontaneous, (if I may be allowed the expression,) termination or death. Whereas the commencement of inorganic matter is accidental—not by any *active* action of any other portion of inorganic matter, nor by any action in the portion of matter itself; but by the passive addition of inactive particles which are brought together by physical powers, and continue united till again separated by some other power which acts sufficiently strong to disunite them, or to overcome that molecular attraction which kept them united.

It is much easier to draw a line of demarcation between the organic and inorganic classes, than it is between the vegetable and animal kingdoms; indeed so difficult is it, that some physiologists deny the possibility of so doing. In proportion as we advance in the scale of animated nature, we find that the variety of effects or phenomena, to be produced, become still more numerous, so that we must expect to find a greater number of elementary substances entering into the formation of the various bodies of living matter, and their structures becoming gradually more complicated; for in proportion as any machine has to perform a variety of offices or duties, must that piece of mechanism be of necessity more complicated. Hence the structure of vegetables is more simple, and their elementary substances fewer, than in the animal kingdom; and it is still more remarkable when we contrast a vegetable with some of the creatures in the higher orders of the animal kingdom. Thus the structure of a zoophyte or a polypus differs much less from a vegetable than it does from many creatures in its own, the animal kingdom. But we always find three elements in vegetable substances, oxygen, hydrogen, and carbon, and to these azote is added, in animal matter. The existence of an alimentary canal has been considered by some as the true characteristic of the animal kingdom; for, say physiologists, "from the polypus, which forms the link between this and the vegetable kingdom, to man, we find that digestion is performed by internal absorption, we find in all, an alimentary canal." Granted, say I; but then I conceive there is a much more decided line of demarcation between them, than the fact that digestion is performed in one class by external, while in the other it is performed by internal, absorption. Who can tell but creatures may yet be discovered in whom digestion is performed by the united powers of external as well as internal absorption: in fact I conceive it very questionable if it be not accomplished even in the polypus itself by these means. If this be established, that supposed line of demarcation is at once rendered invalid. The greater quantity of solids in vegetables than in animals, carbon being the base of the former, while azote is the base of the latter, has been enumerated amongst many other supposed distinguishing marks; but in my opinion they are far inferior to what I consider the only valid line of distinction between them, namely, the existence and functions of the nervous system—*percipient* sensibility, and contractility. Although vegetables possess, in common with all living matter, *organic* sensibility and contractility, yet these powers are totally independent of the existence of a nervous system; this latter fact can be proved by many experiments, one of which is, that the total destruction of the nerves of a limb has no effect whatever upon, nor does it in the smallest degree diminish, the powers of *organic* sensibility and contractility; while the same experiment will effectually destroy *percipient* sensibility and contractility. These latter powers are superadded in the animal kingdom, and produced by the brain and nervous system, and by means of them a peculiar relationship is kept up with all surrounding bodies. I cannot at present enter more fully into this very interesting topic; but must postpone its consideration till our physiological lectures: however, to conclude this part of my subject, I would call your attention to the great chain, as it were, which unites all bodies of matter together—to the mutual dependence between them all—how the vegetable kingdom forms a link between the mineral and animal kingdoms, supported by, and acting upon, the former, and converting inorganic substances into a proper state to afford nourishment to man and other animals: so that all appear made subservient to the use and advantage of the great master-piece—man.

Having then, Gentlemen, made these very brief preliminary observations on the great domain of Nature, I shall now direct your attention to the nature and functions of the Human Body, the mechanism of which will of course occupy much of our subsequent Lectures. Let us first, then, take the most simple possible view of this most wonderful and noble piece of mechanism; let us, as it were, analyse it, for I delight in beginning at simples and gradually proceeding to compounds. Those who begin with compounds, remind me of those who foolishly endeavour to separate two bodies by the

introduction of a wedge with its base foremost; as much difficulty and trouble are saved by commencing to study a subject, by first learning its component parts, as there is by the introduction of the wedge with its thin edge first. Were I abruptly to say that the human body is a compound of bones, cartilages, ligaments, muscles, glands, and twenty other different substances, and that you must learn all these structures well, I might deter those who are yet unacquainted with the profession from commencing to study it; whereas, when I inform you that all the various parts of our bodies have only *four* elementary substances for their base; that these united together, in various proportions, constitute the whole body; and further, that from one fluid (the blood) all the solids and liquids that constitute our bodies are formed, the difficulty and the perplexity of the subject appear to vanish. We should consider the human body as a union of two great machines, each consisting of a number of distinct apparatus, and destined to perform different duties, but all concurring towards one object—the preservation, safety, and enjoyment of the animal: and so intimately are these apparatus connected together, that one cannot be deranged in its functions, without more or less affecting the other. One of these great machines is analogous in its duties to vegetables; that is, merely to act such a part, and perform such functions as are necessary to the preservation of life, hence termed the organic machine; and this consists of the digestive, circulatory, respiratory, glandular, absorbent, and generative systems. Vegetables possess all these, but of course modified according to circumstances; for instance, they having an external instead of an internal digestive and respiratory apparatus. The other machine is destined entirely to perform such functions as enable man, in common with many other animals, to become acquainted with the various works of Omnipotence—to approach those objects which afford us pleasure and gratification, and to avoid those which are disagreeable to us, and would be calculated to injure us. This is termed the animal machine, and consists of the brain, nerves, the five senses, the vocal apparatus, and the muscles of voluntary motion. I need scarcely remark, that the vegetable kingdom is totally destitute of all these: hence I aver, that the possession of these is the only true characteristic of the animal kingdom, although they be not equally developed in all creatures, some animals possessing them more perfectly than others: but it is to be observed, that they possess them in proportion to their peculiar necessities and stations on the face of the earth. Whenever a creature is defenceless, and has to depend for its safety on an early intimation of the approach of its enemy, in it we find the sense of hearing extremely acute; thus the hare, and many other creatures like it. In some we find the sense of smell, in others the sense of taste, or the sense of vision, peculiarly developed, all regulated, as I observed before, by the great Governor of the Universe, according to their peculiar wants; so that, in fact, many of the brute creation far surpass man in some one particular sense.

The celebrated RICHERAND describes ten organic apparatus, and four tissues, as constituting all the various parts of the human body. Most of these apparatus I have just enumerated; the tissues are, the cellular, the muscular, the nervous, and the horny. He, at the same time, ridicules, and very justly, I conceive, the doctrines of BICHAT, in which they are estimated at twenty-one. The point for us to consider at present is, in what manner a perfect knowledge of this great machine and its functions is to be acquired, and what parts of it in particular it is necessary for medical men to know perfectly. The study of the animal machine has been arranged under three distinct heads—anatomy, which consists of the knowledge of the structure and relative situation of its various parts; physiology, which is the doctrine of its functions, and of its elementary substances; and pathology, which means a knowledge of those functions in a morbid state. It is scarcely necessary for me to observe, that to learn the two last you must be acquainted with the first, for it is impossible for you to understand either physiology or pathology, without knowing anatomy: and give me leave to remark, that it is as equally impossible for you to be masters of the healing art, without being well acquainted with these. But, gentlemen, while I give every weight possible to the importance of a knowledge of anatomy, yet I will not allow that it should in the smallest degree supersede the necessity of learning physiology. A man may be a *perfect* anatomist, know every part of the human body to the greatest minuteness, and yet, if he be ignorant of physiology, I defy him to practise the healing art, except as an empiric. And I wish now to be clearly understood upon this very important point, when I say, that I consider physiology shamefully neglected in the medical schools of this metropolis! To what do you conceive I attribute this? Is it to the incapa-

bility of any of the public teachers of our profession? Far otherwise; for I am convinced that many of them are better physiologists than myself. But, gentlemen, I will tell you where the fault lies—it is with the Board of Examiners of the College. It is with reluctance I say so, for no man can possibly respect more than I do the talents of those gentlemen, and indeed to their President I feel myself particularly indebted; but my duty, as a public teacher of the healing art, demands that I should speak what I consider the truth, and particularly when the subject is so intimately connected with the happiness and safety of so many of my fellow creatures. Let it not *for a moment* be supposed, that I wish in *the smallest degree* to say any thing derogatory to the *eminence* of those gentlemen, but this I must say, that they are too good-natured, too easy in their examinations, and I hope they will forgive me for reminding them, if, per chance, they happen to be told what I now say, that they hold a most sacred trust, that they are the safeguards of his Majesty's subjects, and that the death of every man who perishes from the improper treatment of any of their members, may justly be attributed to the facility of procuring their licenses. What did some of my pupils reply to me last year, when I spoke to them for absenting themselves from Lecture, "Sir, you are now only lecturing on physiology; we are anxious to get through the College as quick as possible, and we understand that they do not there examine on physiology, therefore we cannot spend time in attending those Lectures." Now, gentlemen, if it be the object of any of you who purpose entering with me this season, simply to pass the College, as it is termed, I beseech of you do not enter here. There are other Lecturers who will be delighted to *grind* into you the number of muscles on an extremity, or the processes of a bone, or the number of viscera in the abdomen, and at a much cheaper rate than you can enter here. Go to them, you will not be satisfied with the course of study adopted here. I want and desire none but those who wish and are determined to become masters in the profession. You never can practise the healing art with satisfaction to yourselves, and impunity to others, with a half acquaintance of it. You may, with much impunity, be half a barrister, half an attorney, half a bishop, half an apothecary, and half a thousand other professions, but you *cannot* be half a surgeon without the great probability of your *legally* murdering your fellow creatures. Recollect a degree or diploma does not add *one iota* to your stock of knowledge, it only gives you permission to do that for which another man would forfeit his life. Let me then have only *half a dozen* pupils, but let them be such that I can conscientiously recommend to the world, and not like those whom Mr. HUME said, in the last Session of Parliament, in reference to a Scotch University, "were sent forth legally authorized to kill and slay his Majesty's liege subjects." In studying the different parts of the human body, there is something more to be known than the processes or foramina of a bone, or the origin or insertion of a muscle, or the course of a blood vessel, or the ligaments or lobes of a viscus. In studying the bony system for instance, you should first learn what a bone is, how it is formed, what substances enter into its formation, and its different conditions and appearances at the different periods of life. This is learning the physiology of bone—this is osteology. How can any man dare practise the healing art without even this knowledge; and yet I will venture to assert, that three-fourths of those who pass the College know as much about the *formation* of bone as they do about the mountains of the moon. If you do not know what enters into the formation of bone, how can you tell the *proximate* cause of those morbid phenomena, which, in the aggregate, constitute mollities ossium, or fragilitas ossium. Except you are perfectly acquainted with the manner in which bone is formed, its gradual development, its degree of vitality, and its powers of reparation, you neither can tell a diseased bone from a healthy one, nor the probable length of time a fractured bone will take to be re-united, nor how far you can depend upon the powers of nature in the disease of a bone, nor many other important facts. Methinks I hear some say, "There is no difficulty in distinguishing a diseased from a healthy bone, for a diseased bone is always soft, while a healthy one is hard." Alas! if this be the only way by which you distinguish a morbid from a healthy bone, give me leave to inform you, that your diagnosis will be most generally incorrect, for healthy bones in children are soft, and that in inverse ratio to their age, or in proportion to their infancy. The colour of a bone denotes its degree of vitality, and its powers of reparation depend upon this; so that if you be unacquainted with those natural changes which take place in the osseous system as we advance in age, your treatment of fractures, of dislocations, and of many morbid affections of bones, will be attended with much uncertainty, empyricism, and detriment to your patients. The

muscles, which are the active organs of motion, and are divided into the voluntary and involuntary, demand particular attention. I have known many students who considered it quite sufficient to know the number of muscles on the extremities and trunk, their names, and their origin and insertion; but, Gentlemen, I tell you this acquaintance with the muscular system is by no means sufficient; there is much more to be learned about it. You must learn what the nature of muscle is, what are the peculiar powers it possesses, and what circumstances diminish or augment those powers; also you must study the relative situation of most of the muscles of the extremities, their compound and simple action. Knowing the former will enable you to recollect the exact situation of the blood vessels, and the latter will enable you to reduce with facility, and proportionate ease to your patient, dislocations and fractures. For except you know what muscles you have to overcome in reducing any particular dislocation or fracture, your attempts will be attended with hazard and much trouble. True, you may finally reduce them; but so do all the bone-setters in the country, who know nothing at all about anatomy; they accomplish it by pure mechanical force, and so do you, but woe to the unfortunate individual who falls into the hands of either. Many surgeons there are even in this, almost the nineteenth century, who, when either giving directions in their works how to reduce dislocations, or when attempting the operation themselves, appear to forget, I will not dare to say, do not know, that the bones have no more power of resistance than the legs of this table; for, in fact, the bones, which are the passive organs of motion, cannot present the least resistance, nor can they move one inch without being acted upon by the physical force, either directly of the muscles, or of some foreign power. When a bone is displaced or broken, those powers which displaced it, and keep it in its unnatural situation, must be overcome, ere it can be replaced. How important then must be the knowledge of those agents, which are the means of keeping out of its proper place or situation a dislocated or fractured bone. I shall mention two very common instances of error committed in consequence either of not reflecting upon, or of not being acquainted with, the nature of muscular power and of the osseous system. The first is in the case of a compound fracture of the bones of the leg, where the inferior extremities of the superior portions of the tibia and fibula appear to protrude, and appear much displaced, when, in fact, they are in their natural situations; but the lower portions being displaced by the action of the gastronomic muscles, which are inserted into the heel bone, and which contracting, draw them upwards and backwards, together with the ancle and foot, so considerably deform the broken limb, that an uninformed or ignorant practitioner is always deceived, and his method of reducing the fracture betrays his want of knowledge, for he directs all his powers to the replacing of those parts which are actually in their natural situation; and after giving himself much trouble, and his patient still more suffering, some accidental change of position brings the parts into contact, and of course the *surgeon* has set the fracture. Now all this trouble may be saved, by simply relaxing the muscles just mentioned, when the broken extremities of the bones can be forthwith brought into contact. I recollect one case in particular of this occurring where I was sent for: the lady, a clergyman's wife, was thrown out of her gig, by which accident there was a compound fracture of the tibia and fibula a little above the ancle joint. It occurred in the country, several miles from town. A neighbouring surgeon was immediately sent for, who, after *labouring* with two or three assistants for nearly an hour, *fortunately* replaced the separated parts. In the course of three or four days I was sent for, in consequence of the parts having been again displaced, owing to premature parturition brought on by the accident. When I arrived, although the bones were exactly similarly circumstanced as immediately after the accident, yet I found no difficulty whatever in replacing them. The next very common instance where the depth of a surgeon's knowledge may be easily fathomed, is the case of fractured clavicle, where the sternal portion always *appears* much displaced, in consequence of the scapular extremity of it being drawn *downwards* by the contraction of the latissimus dorsi and pectoral muscles acting upon it through the medium of the arm and shoulder bones, into which these muscles are inserted. To this sternal portion of the bone much force is too frequently applied, which is only calculated to produce considerable pain and subsequent irritation, and to effect no possible advantage; whereas, by simply elevating the arm, the parts may be brought into immediate contact, and that with very little, if any, pain. Until the days of the celebrated POTT, you are all aware of the rough and unscientific means adopted to reduce fractures and dislocations; the pulleys, lad-

ders, and various other pieces of mechanism, that were in use before his time, had more the appearance of being made for the purpose of displacing, than of replacing bones, or for trying people *on the rack*, as it was termed, and which is adopted in some countries even at the present day. In proportion as our knowledge of the powers and actions of the muscles increases, so do the means adopted by our profession for regulating their actions, and treating their diseases, become more simple and more scientific; and it is now believed, that simplicitas scientiæ animavest. To the same increase of knowledge may be attributed the almost total abandonment of the practice of *stitching* up the wounds of the soft parts, so that instead of adding to the sufferings of our patients, and instead of adding punctured wounds to the wound which accidentally occurred, we now can, in the majority of instances, by a simple alteration in the position of a limb or part of the body, so as to relax the wounded muscles, bring the lips of the wound in contact, and by observing the same position, preserve them so till the parts become united. Thus plasters, bandages, and rollers, have almost gone completely out of fashion amongst the men of science in our profession; and for two very good reasons: first, because we can do very well without them, and secondly, because they frequently interfere with active and necessary applications, and thus are productive of much evil; that is, in few words, because they are generally useless and mischievous. But time would fail me, gentlemen, to mention the many instances where a perfect knowledge of the muscles is of the greatest importance, a knowledge, I mean, not merely anatomical, but still more particularly, *physiological*. The viscera constitute the most important part of the human body, for they perform those functions upon which the existence of the animal directly depends; such are the thoracic and abdominal viscera. In the thorax we have the heart, the centre of the circulating system, and the lungs, the chief organs for regenerating the blood. In the abdomen, we have principally the digestive apparatus, consisting not only of that canal in which the process of digestion is performed, but of various glands which are destined to secrete fluids that assist in this important process, and in separating from the blood a variety of excrementitious substances which are conveyed out of the system. How any man can have the hardihood to attempt practising either medicine or surgery, without a knowledge of the physiology of those most important parts, I am at a loss to conceive. I am not now alluding to an acquaintance with the shape and number of any of those viscera, or with the number of lobes or ligaments the liver has, or that the gastric juice converts the food in the stomach into chyme; or that the liver secretes the bile, and that this fluid converts the chyme into chyle; for I suppose no man gets a diploma from any college without knowing this A B C of his profession; but I allude to that knowledge of the functions of the abdominal viscera which, I regret to say, is but little attended to by the generality of medical students in London, and that for a very good reason before noticed. As respects the abdominal viscera, gentlemen, you must learn not only their relative situation, shape, and divisions; but you must learn their functions—their nature—their sympathies—their connexions—their peculiar uses—and the sources upon which they directly depend for a supply of those fluids which contribute towards their several processes. Of the thoracic viscera, there is no tyro who does not know the structure of the heart, and the circulation of the blood, as well as that in the lungs the process of respiration is performed. But you have to learn a little more of those parts; you must learn by what powers the air is brought into the pulmonary tissue—what are the chemical changes the blood undergoes in these organs—how animal heat is produced—and many other important points connected with the functions of these organs. That the physiology of the brain and nervous system should be attended to, I am sure no person at all acquainted with the profession will question. It is true we know but little about the modus operandi of the brain, or of its prolongations—the nerves; nevertheless it is only by a steady investigation of them, and the effects produced by them in various parts of the body, that we can possibly expect to become better acquainted with these organs, and apply the little we do know to the very useful object of relieving the sufferings of mankind. I am sorry at having it in my power to say, that this is another subject to which but little attention is paid by nine-tenths of medical students in this metropolis. I am aware that they are generally particular in acquiring a knowledge of the anatomy of the brain, because they expect to be examined on it, but as to the physiology of this organ, they appear to care but little about it. I have known pupils, nay, members of the college, who could tell you very accurately the differences between the symptoms of pressure

on the brain and concussion of it, but who had not the most remote idea of the reason why the stomach is irritable in the latter case and totally insensible in the former, nor why the pupil is generally contracted in the one and dilated in the other. These are gentlemen who despise physiology, and think that a knowledge of the structure and situation of the viscera is quite sufficient: but who can account for the symptoms of phrenitis, or of hysteria, or of syncope; or why syncope is so frequently produced by bloodletting, or from drawing off the fluid of ascites, or after parturition, except he be acquainted with the physiology of the brain; and unless he knows the proximate cause of those various morbid phenomena, how can he possibly prescribe those remedies, or adopt those measures, which will be calculated to check their progress, and ward off the impending evil? The brain may be considered the centre of the animal machine, as the heart is of the organic one; but between these two great centres of animal life, there is kept up a mutual dependence; the brain, to perform its functions, must have a due supply of arterial blood; and the heart appears to require, in its turn, a due supply of nervous fluid. So that if any thing occurs which prevents the free access of blood to the brain, or suddenly draws it off from this organ, there is forthwith a cessation of its functions, that is, syncope; thus polypi in the heart act in the former way; while phlebotomy, tapping for ascites, and parturition, act in the latter way. The course and distribution of the nerves should also be attentively studied, for by an acquaintance with them we are frequently enabled to discover the real seat of a disease or morbid action, and distinguish between a pain which is only symptomatic of an affection in a remote part, from that indicative of a disease in the part itself. By a knowledge of the course of the nerves, we can account for a pain in the head from disordered stomach—for pains about the knee, in a disease of the hip-joint—for pains felt on the outside of the thigh, when there is a stone in the kidney or bladder; and frequently we can tell the situation of a diseased vertebra, although there be no external morbid appearances, or curvature of the spine, merely by attending to the muscles particularly paralysed, and then recollecting the origin of those nerves which are distributed to those muscles. The advantage derived from attending to the *functions* of the nerves is equally important and indispensable. They are, as it were, the internuntii between the more remote parts of the body and the brain—the organ of sensibility, of thought, will, and understanding. They convey to the most distant organs the desires of the will, and they conduct back to the brain the various sensations of feeling, seeing, smelling, hearing, and tasting. When there is sent to the brain a preternatural quantity of that fluid (the blood) upon which a due performance of its functions depends; the consequence is a morbid development of those functions, and a morbid acuteness of a majority of the senses. When this occurs to any particular part of the body, the effects produced are analogous; for the functions of the organ or part become morbidly acute. Thus if there be an unnatural quantity of blood sent to the organ of vision, constituting inflammation of it, there will be an inability to bear the usual rays of light; if to the organ of hearing, there will be an inability to bear the usual sonorous rays; if to any common part of the body, the sensibility of that part will be considerably increased, so that the slightest touch cannot be endured. On the contrary, in proportion as the brain, or the nerves, are deprived of the natural quantity of blood, will there be a deficiency in function and a diminution of sensibility.

The next part of the animal machine to which I beg leave to call your attention, and upon which I purpose making a few cursory remarks, are the blood-vessels. Now I conceive a great error is current amongst students on the subject of the arterial system; they suppose that if they can repeat all the branches of the principal arteries, it is quite sufficient. I have known many who could tell you, even to the greatest minuteness, all the branches of an artery—the rami, the ramusculi, the ramuscunculi, and the ramuscunculissimi—and yet know nothing about the structure of an artery, or the relative situation of any of the important trunks. This is what they consider knowing the anatomy of the arteries; but, gentlemen, let me tell you, such knowledge is very unimportant; and that you will spend much time, and to little profit, in committing to memory what you will in a very short time forget; and were you not even to forget it, would be of no practical advantage whatever to you. There are really but few arteries in the body the *relative* situation of which require to be well known, the majority of which are, the carotids, femoral, tibial, subclavian, axillary, brachial, radial, and ulnar arteries. I do not by any means pretend to say that these are the *only* arteries you should learn, quite the contrary; but I mean that these are by far the majority of those a know-

ledge of which, in a practical point of view, is indispensable for the Surgeon. Much time, as I said before, is often spent in studying those minute branches that could be very profitably occupied in learning the relative situation of those important trunks, which are very much exposed, very frequently injured, and most commonly the seat of surgical operations. In endeavouring to acquire a knowledge of the relative situation of the blood vessels, the muscles should be in general your principal guides: thus the sartorious muscle should be your guide to the femoral artery—the biceps to the brachial—the tibialis anticus, to the anterior tibial—the supinator radii longus, to the radial, and so on. You must also pay great attention to the accompanying nerves and veins, and recollect how these lie with respect to the artery, and to one another; for wounding, or including in your ligature, any of them would be attended, if not with serious consequences, at the very least, with much trouble and confusion. Those who practise in the country, at a distance from other medical men, should, in particular, be well acquainted with the situation of the arteries, and be ready, at a moment's notice, on any emergency to cut down and secure any of them. Only reflect for a moment at the confusion, the dismay, and the disgrace, that would attend you, were you called to a person on the point of perishing from hæmorrhage, and that you could not secure the vessel! An inquest is held,—the body is examined by another surgeon, who declares that had proper assistance been rendered the person's life would have been saved! This one circumstance would damn for ever your professional character. I have now only appealed to your feelings in a selfish point of view; but suppose this person were your dear friend, or your parent, or your wife, or your child, whose very existence was nearly as dear to you as your own, what then would be the state of your mind? Would you ever forgive yourself for your ignorance? But you may in such a case be the cause of the death of two persons; first, by the want of a proper knowledge of your profession this man bleeds to death; and supposing the wound to have been inflicted by another person, this third person is tried for murder, found guilty, and executed accordingly, all which may be attributed to your idleness and ignorance. Oh, then let me entreat you, be diligent in acquiring a perfect knowledge of your profession, for these cases are by no means imaginary; too often, I doubt not, similar ones occur. The structure of an artery is also of great importance for you to learn; you should understand how the calibre of an artery becomes obliterated—by what process nature accomplishes it—why a wound in an artery is not healed as soon as a wound in a vein—the object you have in view in tying a ligature round an artery—how it is to act—and why you are to disturb, as little as possible, the vessel while tying it. If you be not acquainted with these points, you will practise the healing art only as an empiric, although you might know fifty branches of an artery, yes, and have a diploma in your pocket.

As it respects surgery, I need scarcely observe that there is no science, or profession, which appears to have kept pace with it in improvement. Every year, nay every day, new discoveries are making which contribute much towards the prolongation of life, and the amelioration of suffering. But still there is a great deal left for you to improve on, much yet to be discovered; for instance, hydrophobia and urinary calculi, the banes of mankind, have hitherto baffled every exertion that could be used, and every means that intelligence could devise, for the dissolving of the latter, and the cure of the former. Still we are not to despair, you know not but one of you may yet be crowned with honour for removing these stigma from our profession: recollect that "labor omnia vincit." Not many years ago the methods adopted by surgeons, in their various operations, rendered actually the remedy worse than the disease. It is too generally believed, that attending two or three courses of surgical lectures, and reading a few surgical works, is quite sufficient to make a surgeon; but this opinion is extremely erroneous; surgery is a science that cannot be learned in a moment—there must be, in order to be a master of it, not merely a formal attendance upon lectures, and a formal reading of authors, but there must be a real exertion of the mind and understanding. You must study pathology; read upon inflammation—study and meditate upon its proximate and remote causes—ask yourselves the question, what is the cause of this redness, of this increased heat, of this pain, and of this swelling, the four great characteristics of inflammation. When you can account for these appearances, when you can solve these queries, you will scarcely require to be told what you should do to subdue them. Whereas it will require ten times as much trouble to learn how to treat inflammation, if you commence its study by committing to memory the symptoms, and without knowing their *proximate* causes, learn the various me-

thods recommended to remove them; and after you have acquired all this information by this means, it will be extremely imperfect, and you will be constantly in danger of committing serious errors. Inflammation is so connected with nine-tenths of the morbid affections incident to mankind, that it should be considered the foundation of the science of surgery; therefore, you cannot devote to its investigation too much attention, or too much time. I would strongly recommend you to study over and over again HUNTER'S invaluable work on the blood; and when you have become well acquainted with it, study THOMSON on inflammation. Learn these books, compare what you read with what you see in your Hospitals, and, finally, "*learn to think.*" When you are *perfectly* acquainted with inflammation, the trouble that will be over, the little, comparatively speaking, that you have afterwards to learn from books, will appear to you incredible; for give me leave to inform you, that three-fourths of almost every book that is written on surgical subjects, whether it be professedly on hernia, gunshot-wounds, aneurism, or any other topic, are taken up in giving directions connected with inflammation, and which will, of course, be perfectly useless to you, if you are previously well acquainted with the subject. As there is the art, as well as the science of surgery, so there are mechanical as well as scientific surgeons. One excels in *handling* the knife, while the other excels in knowing *when* it should be handled. There is a much greater simplicity in our profession than the profession are generally willing to grant, and that for very obvious reasons; but the public are now becoming so enlightened that the practices of the pretender will not answer, and the curtain of ignorance being drawn aside, the mysterious art is found to be accessible to the understandings of most men. There are a number of surgical works, in the perusal of which you will only lose much time, and many of them are, in fact, calculated to lead you into erroneous conclusions. Some write to improve the profession—others to give publicity to their names—and others from pride, for, as Lord Byron says,

'Tis pleasant, sure, to see one's name in print;
A book's a book, altho' there's nothing in't.

You will find many voluminous works written on particular wounds, as if there were any thing more connected with them than what is included under the scientific division of them into simple-incised, lacerated, punctured, and contused. Some of you may be inclined to exclaim, "What, this is pretty doctrine indeed, do you pretend to assert that gunshot wounds, upon which so much has been written, do not differ from those you have just mentioned?" Yes, I do say, although I am aware our forefathers attributed their peculiar appearance to being burned, and many of the moderns consider them extremely anomalous, that they do not differ from those before-mentioned; and further, that there is nothing in their treatment which is not included under the head of those wounds. And in making these assertions I am confident there is no surgeon of eminence but will concur with me. I must postpone entering more fully into this subject until my Surgical Course, when I shall have great pleasure in pointing out to you much useless matter, and clearing away much of the rubbish which even yet adheres to our profession. Now, gentlemen, in drawing towards the conclusion of my Lecture, permit me strongly to advise you to arrange your time. Out of the four and twenty hours, devote four at least to study, after which there will remain twenty hours for sleeping, eating, and enjoying yourselves. I am sure you cannot consider the few hours you spend in attending Lectures and Hospital practice as laborious; but if so, you would have, at all events, seventeen hours totally free from all species of professional pursuits. Let me entreat you again, while I congratulate you on the choice you have made of our profession, for I must be an exception to Horace's rule, in praising my own pursuit, to keep in mind the importance of your profession, and the great responsibility attached to it. Be not satisfied with holding a middle station in it, but aim to be at the head of it. Let the great prize that always awaits him who becomes celebrated in it, independently of the peculiar satisfaction you will always feel in mitigating the sufferings of man, and in frequently restoring to health, and to his anxious friends, the parent, the consort, or the child, stimulate you to exertion and indefatigable industry, recollecting the motto of this school, "Virtus et perseverantia, impedimenta omnia, postremo vincent.

I cannot conclude, without directing your attention to a subject which, although last in this Lecture, is far from being the least important: I allude to the effect produced upon some men's minds by the vast treasure of knowledge which the auxiliary departments of the medical profession develope, and which effects are somewhat analogous to the state the or-

gans of vision of men are thrown into, by a too powerful effulgence of luminous rays. Those persons do not, except in a very few instances, become exactly blind, but they become what we in common language term dazzled; they are unable for some time to behold objects as they really are, and require the assistance of the other senses to correct the deception. So it too frequently happens with some men's brains, while studying the wonderful works of Omnipotence; they become dazzled and puzzled when they cannot comprehend all things, or proceed in their investigations beyond a certain boundary; for let me tell you, gentlemen, there is a line of demarcation beyond which you cannot proceed; beware, therefore, lest you fall into the same errors with others. If you expect, or flatter yourselves, that you will be able to understand, and satisfactorily to account for, even the majority of the phenomena in the animal economy, you will be sadly disappointed; and, after all, we really know but very little; who understands the growth of a blade of grass? But whatever is necessary for the comfort and happiness of man the Deity has permitted man to know—and no more. Some of our profession have become so proud from an acquaintance with the functions of living matter, and of the operations in Natural Philosophy, that they suppose they should therefore understand the nature and functions of the immortal part of man, and how it is connected with his mortal part; and because they are unable to do this, or to comprehend these things, they have had the hardihood to call in question its very existence. But how, in the nature of things, could we, through the medium of *material* organs, understand the functions of *immaterial* agents? Can the organs of vision convey to the sensorium the ideas of sonorous impressions? Or the organs of hearing, luminous ones? Certainly not. Can a man who is born blind be taught the nature of colour; or the man who is born deaf, the nature of sound? No! No more then can we comprehend, through our mortal organs, the nature of the immortal soul. Were I to tell nine-tenths of the inhabitants of this earth, that, had they been born blind, I could not by any means in my power explain to them the nature of colour, they would not believe me; yet there is not a more certain fact, as appears by the answer of a very intelligent person when asked what idea he had of the colour red, said, he should think it resembled very much the sound of a trumpet! But notwithstanding all the wisdom, and all the philosophy, and all the discoveries of man, since the creation to the present day, none have been able to avoid the sovereign mandate of Jehovah, "dust thou art, and unto dust shalt thou return!" "I will bring to *nothing*," said the Almighty, "the understanding of the prudent; I will destroy the wisdom of the wise!"—"He spake and it was done; He commanded and it stood fast." Now, gentlemen, I shall conclude, thanking you for your attention, and wishing you very sincerely every prosperity and success in the study of our most noble and useful profession.

MR. DERMOTT.

New Theatre of Anatomy, Little Windmill-street, Golden-square.

Gentlemen,

Aware of the responsibility devolving upon me in again undertaking to commence a course of my Anatomical Lectures, and also of the difficulty of doing the justice to this subject which it claims by its importance, and which is demanded by your own interests individually, the impressions upon me at the present moment cannot be of a very ordinary character. I shall to-day, however, preface my course of instruction by observations introductory to that science which is to constitute a principal part of your immediate studies, and which will in fact hereafter prove the spring of all your professional actions. I am induced to address you in this instance, not because I hold it necessary, or even important, but from a wish to act in accordance with a custom almost universal.

Anatomy, in the exact meaning of the term, implies the practical dissection of animals for the purposes of science. The records of its history do not evidently reach farther back than the times of the early Greek philosophers, who embodied it in their studies of natural philosophy; among these, particularly, are Thales of Miletus, and Pythagoras, who lived about 700 years before Christ.

It must be obvious, that, previous to their time, there must have existed some rude and partial knowledge of the situation and use of some of the parts, when we take into consideration their constant custom of sacrificing various animals to the Deity, and inspecting the internal appearances, with a view to determine future events; and also their religious care in selecting certain of the parts for sacrifice, and rejecting others as unclean and unhallowed.

A further evidence that the ancients possessed some knowledge of anatomy, may be drawn from the opportunities frequently offered of seeing internal parts, in consequence of wounds incurred in combats, or from accidents; and, finally, the practice of embalming bodies must have afforded at least a general idea of the *viscera*.

From the above customs we derive numerous satisfactory proofs that the ancients were possessed of a certain general knowledge of anatomy; and thus we observe some glimmerings of anatomical knowledge in Homer's descriptions. There Phorcelus is pictured as having received a wound by a thrust from a spear through his right side, under the bone to the bladder. Æneas is struck by Diomed with a stone, whereby the acetabulum is said to have been broken, and the adjoining nerves much injured,—that it required the aid of a divinity to repair the damage, and that his mother Venus undertook to cure him of his lameness. Apaizion's liver is described as wounded by Euripilus's spear piercing his epigastric region.

In Herodotus, the barbarous Cambyses, King of Persia, aims an arrow, with so much exactness, at the son of Praxaspes, as to pierce his heart, thereby to prove that he was not, as charged of him, besotted with wine.

It appears, however, that Democritus, of Abdera, was the first of the philosophers of his time who applied himself closely to anatomical investigation. Hippocrates, his contemporary, had the merit of being the first who pursued anatomical research with a view to make it of use in the practice of medicine; and here we can, therefore, properly commence the history of this invaluable science.

This great man, justly styled *the father of medicine*, was a descendant of Esculapius, and studied under the greatest masters of philosophy and his favourite art. Although, however, Hippocrates collected together more anatomical knowledge than all who preceded him, (for in his works are to be found all the anatomical facts of his day, either carefully collected by him from others, or discovered by the activity of his own research); some there are who, notwithstanding this, deny his having dissected either brutes or the human subject; he describes, however, some parts of the human body ascertainable only by actual dissection. He also divides the body into three elementary principles, *solids*, *fluids*, and *spirits*, of containing and contained parts. He was acquainted with the peculiar manner in which the arteries and veins were distributed, and asserts that the former arise from the heart to contain the spirits; the latter he thought commenced from the liver, which was the fountain of the blood, and *secreted the bile*; but he made no just distinction between arteries, veins, nerves, or tendons. He conjectured the brain to be a gland, the originality of which idea is generally attributed to Malpighi. After the time of Hippocrates the knowledge of anatomy continued to be fostered and improved by the philosophers of the Grecian schools, the most eminent of whom are Plato and Aristotle; the latter had a large pension allotted him by his pupil, Alexander the Great, to enable him to compile a natural history of animals.

As soon as the Grecian authority was extended to Egypt by the conquests of Alexander the Great, a noble school was founded at Alexandria, under the protection of the Ptolemies, and in proportion as the sciences decayed in Greece, they seemed to rise with increased energy in the Egyptian capital.

Amongst the great objects of education in these schools anatomy was particularly taught; and so highly did it rank in public estimation, that the Greek youth were used to resort thither for improvement. Here Erasistratus and Herophilus highly distinguished themselves by anatomical research; they are said to have dissected several hundred bodies; and hence may have originated the report of their having dissected men in a living state. The former described the lacteal vessels in a kid, also the origin of the nerves and their functions, and attributed digestion to the mechanical triture of the stomach. Herophilus was cotemporary with Erasistratus, and assisted him in the discovery of the nerves, and gave name to the calamus scriptorius of the fourth ventricle of the brain, and also to the duodenum. He likewise described the retina and the choroid coat of the eye, the pia mater, and the Fallopian tubes.

After him anatomy made but slow advances, during a period of about 500 years, till Claudius Galen formed a new era in medicine. This great man was born at Pergamus, in Asia Minor, about the 130th year of the christian reckoning. After visiting most of the famous schools of philosophy, he resided chiefly at Rome, and was physician to four succeeding Roman emperors. He compiled a voluminous system of medicine, and added the result of his own labours and observations to all the information that could be derived from the writings of Hippocrates and the philosophical schools of that period. In bringing into

one point of view all the medical and philosophical science of his predecessors he has conferred very great advantages on the healing art; but it is supposed that his dissections were made chiefly on brutes, particularly monkies, and even some venture to assert that he never dissected the human body.

It is, however, universally acknowledged that Galen was the first who placed anatomical science on a proper basis, and to him, therefore, is due the eminent praise of having stood alone for upwards of ten centuries, the sole guide to anatomical knowledge,—his medical principles prevailing over all competition, and disdaining all innovation:—his successors implicitly yielded to his authority, despairing, as it were, of being able to effect any further improvement in the art.

At the period in which Galen lived, and in ages subsequent, it is painful to observe the barbarism and mental degradation which prevailed, and this is the more striking when it is brought in comparison with the illumination which has burst upon science in after ages, when his system had ceased to exist. During this long and lamentable interval, when, by the listlessness of those men whose sacred duty it was to cultivate science by every possible means of inquiry, we find nothing new, or if deemed so, the attempt to show it was stigmatized as deviating from the dictates of the Galenic oracle. The energy of genius became shackled,—the mind drifted in chaos,—blinded by opinions which then held the schools in subjection, and which were tainted with the false philosophy of Aristotelian argument, which the sages of the day upheld as *wisdom*, but which modern research in anatomy and chemistry has flung aside as contemptible and mischievous. Thus it happened that through the prevailing influence of Galen's doctrines the progress of anatomy appears to have been impeded, and practical research brought into disrepute. And here let me add, that philosophical opinion in any science, and how plausible soever it may appear, should be received with caution and attention, until by observation, comparison, and experiment, its truth is satisfactorily established. On these same grounds we have, however reluctantly, to blame the men who have transmitted to us the science of anatomy, a science preeminently affording incontrovertible argument, no less, indeed, than visual demonstratation of facts, whence clear inferences are drawn which build up physiological doctrines, and which, if properly conducted, may amount to rational demonstration. These men appear to have approached with trembling steps the threshold of truth, whose temple is ever present to the human mind, and sheds its divine splendours over the whole face of the creation. Unhappily their understanding was not expanded commensurately with their subject, and they consequently evinced a want of that energy and acuteness which are peculiarly requisite in anatomical inquiry; a misfortune truly to be regretted in that stage of the science to which this historical sketch has now a reference.

Thus it is that the greatest talents displayed by an individual may be attended with injurious results; for when the leader in a system evinces superior powers of mind, persons of less active intellect, or more limited endowment, are apt to receive his opinions as divine, and incautiously gulp down his hidden errors or absurdities, in full confidence of their truthful purity and efficacy. This is a lamentable trait in the human mind; this is the effect of the almost unconquerable tendency of the human mind, to allow the authority of a man whom we venerate for the cause of science to supersede the exercise of our own reasoning powers.

On the decline of the Roman empire, anatomy experienced, in common with the other sciences, the fate of the empire itself. The Roman people were attacked, and the empire overrun, by the barbarous nations which surrounded them; learning of every kind came to be almost extinguished in a Gothic night throughout Europe, and the human mind was plunged into the depths of ignorance and superstition; hence the succeeding ten centuries have received the appellation of *the dark ages*.

In Egypt, the followers of Mahomet overturned and destroyed the Alexandrian school, and effectually dissipated the remains of learning still existing. The Saracens, however, afterwards repented of their barbarous blindness, and began to collect the ruins of that literature, of which they had themselves been the destroyers. But science did not long enjoy the protection of the Saracen scimitar. The Saracens being overpowered by the fierce and barbarous Turks, who carried desolation, ignorance, and oppression every where, as marks of their triumphant career, and crushed the infant institutions of science erected by the Saracens; the city of Constantinople having fallen into the hands of the ravagers, the learned Greeks were compelled to flee to the western parts of Europe for safety, carrying along with them the stores of information still surviving. This catastrophe, conjoined with the invention of

printing at a subsequent period, tended materially to the improvement of society; a knowledge of the Greek authors became disseminated, and they became known and recognized as the best writers on medicine and anatomy.

For the restoration of anatomy and of science in general, we are indebted to the *Italians*, but they were so occupied in endeavouring to recover the books, correcting the copies they could obtain, and studying their contents, and commenting upon their meaning, that they did not themselves attempt much in practical anatomy. Mundinus, however, particularly distinguished himself in anatomy. He was professor at Padua, and published a system of anatomy, which was the only one taught in the schools for a great many years. The researches of this ingenious man were unfortunately arrested by a decree of Pope Boniface VIII. prohibiting the boiling and preparing of bones. The science was afterwards cultivated by succeeding Italians; for instance, the famous surgeon Guido Comliaceneis, or Gui de Lanliac, who barely mentions the anatomy of the subject upon which he operated, but cannot have pretension to any new discovery, unless that he prohibited a cut to be made in a longitudinal direction above the eye-brow, lest the fibres of the *orbicularis palpebrarum* should be cut across; he also first compared the under extremity of the os humeri to a pulley, a term which will always be retained, as it is very appropriate.

About the close of the fifteenth century, an Italian professor, named Carpus, announced numerous important discoveries in anatomy, having, as he stated, dissected more than one hundred dead bodies, and added several discoveries of his own to those already known; and aiming, perhaps, at the honour of sharing the calumny flung upon the illustrious names of Erasistratus and Herophilus, he gave full scope to the investigation of the human frame, so far as to bring upon himself the imputation of having dissected his subjects in a living state.

Alexander Achillinus, professor in Padua, published his commentary on Mundinus, and his system of the human body. Alexander Benedictus, cotemporary with the two last mentioned, described the mucous follicles near the orifice of the meatus urinarius in females, and his illustrations are founded on precise data.

In 1535, Andreas Lacuna, a Spaniard, published his anatomical system at Paris, and likewise an elegant abridgment of Galen's works. The following year Nicholas Massa, a Venetian, published his *Liber Introductorius*, wherein he mentions some new discoveries. Anatomy by this time had got diffused throughout Germany and France. The same year in which Massa published his work, Johannes Guinterus, of Anderon, teacher at Paris, and one of the preceptors of Vesalius, published his anatomical institutions, and several years afterwards published his work "On Ancient and Modern Medicine." He also gave name to the pancreas, explained the tortuosity of the spermatic artery and vein, and explained the nature and function of the sphincter vesicæ. Fernelius, a celebrated anatomist at Amiens, was contemporary with Guinterus.

In 1543, the great Vesalius, of Brussels, published his grand work on the stucture of the human body. He had derived his information from the best living authors of France and Italy, through whom he became acquainted with the works of the ancients. His book professedly declared, that anatomy could be studied only by dissection, a practice then held in abhorrence, and which it was necessary should be carried on in the utmost secrecy, in order to avoid the danger with which it was constantly threatened by ignorance and superstition. In this work Vesalius first wrested anatomy from the tyranny of Galen and Hippocrates, whereby he has immortalized his fame, and secured the lasting admiration of the learned; but his great talents excited the jealousy, envy, and the severest criticisms of his contemporaries, in opposition to the important discoveries he announced, on account of his bold innovation upon the authorities so long established. By his practical researches into the structure of men and animals, he detected numerous errors of Galen's, which he did not spare to expose, showing in many parts of his work that he had described the human body from the dissection of brute animals.

Eustachius at Rome, Driander at Marpurg, Jacobus Sylvius at Paris, and Fallopius, were amongst the opponents of Vesalius. The criticisms of Sylvius were envenomed with the most satirical abuse. Fallopius, formerly his pupil, and a person of great talent, was the only one who preserved decency in his criticisms, influenced by a sense of gratitude for his former instruction; and he even ultimately admitted the justness of the doctrines promulgated by his master Vesalius. Notwithstanding the criticisms and vituperation of his rivals, (but to the injustice of which Nature herself will bear him witness,) the abilities of this great anatomist proudly bore him beyond the reach of their opposition; his profound know-

ledge gained him the confidence of his emperor, Charles V, and of the nobility; so that the sovereign appointed him his physician, and kept him constantly about his person in all his expeditions.

But the brightest genius, like the sun, has its clouds; both emanations from the source of divine wisdom, are by the immutable laws of the Creator subjected to be obscured, not by any defect in their functions, but from accidental circumstances which will frequently intervene whenever their properties are misunderstood. The error that shut up in a dungeon the illustrious Galileo has vanished, and his genius now stands confessed, as bright, as beneficial, and as God-worthy as those planets which he taught us to observe and know:—*such was Vesalius.*

His science in dissection is best illustrated by his plates, which are said to owe their brilliancy to the inimitable pencil of Titian;—and here I must be permitted to say, that a faithful delineation of the parts, as they appear on dissection, is highly conducive to the retaining of a perfect recollection of the anatomy of the subject.

The labours of this extraordinary and lynx-eyed anatomist thus made manifest, soon caught the attention of Europe, and a numerous and eminently gifted list of practitioners, extending his views, brought the science rapidly to what, then comparatively, might be called perfection.

We must, however, revert to the circumstance which led to the premature and pitiable death of a man to which anatomy owes such obligations, and to which a preceding observation had allusion. In the course of his investigations, the body of a Spanish nobleman, who had recently died, was submitted for his examination; and during the operation some persons present asserted that they observed the heart to palpitate—insinuating thereby that Vesalius was a murderer. The unhappy philosopher was, in consequence, compelled by the rigorous superstition of those ages, to submit to the condemnation (a mitigated one) of performing a pilgrimage to Jerusalem! With this cruel mandate he complied, and having accomplished the expiatory task, as he was on his return to resume his professional honours in the anatomical chair at Venice, he suffered shipwreck on the island of Zante, and there perished of hunger, at the age of 50; the date of this lamentable occurrence is preserved, being the 15th of October 1564.

From the time of Vesalius, the names of many distinguished individuals are recorded as having laboured incessantly and successfully in promoting the progress of anatomy. Eustachius, Fallopius, Sylvius, and many others, by their indefatigable researches threw much light upon this important subject, the latter being particularly celebrated for the accuracy of his plates.

In the year 1628, our countryman, Dr. William Harvey, immortalized his name by his signal discovery of the circulation of the blood, by which the great secret of the animal economy was revealed. Thus did the activity of one powerful and inquisitive mind completely subvert the erring theories long existing, and rendered all influence apocryphal. The functions and constitutional uses, which previously appeared to be enveloped in mystery—incapable of explanation, at once became plain, and a wide path was thrown open to further improvements in anatomical practice; and discoveries in pathology of the highest value immediately followed. These discoveries have since that period so amazingly multiplied, as to characterize the present time as an era deserving, in a remarkable manner, a place in the annals of philosophy, both as to the structure and functions of the animal organs, and the application thence derived to the improvement of human happiness.

On the *promulgation* of this supereminent discovery, ("envy will merit like its shade pursue"), the great investigator of the vital circulation, like Vesalius, had a host of inglorious adversaries arrayed against him. Was the argument derived from his discovery to be affected by dogmata long received? The superstitious spirit, still surviving, was in arms to oppose such a dangerous novelty; but, happily superstition had lost its hold, and something like reason was to be brought into the question. Some of the sages of that day attacked his doctrines on the ground that they were at variance with the authority of the ancients; arguments, of course, consisting of words, and these with experiments clumsily or ignorantly conducted, tended to confirm Harvey's triumph. That eminent benefactor of mankind had the happiness before his death, after enduring what may be called a persecution from the mischievous tattle of his medical contemporaries, to enjoy the consolatory satisfaction of seeing that the whole medical world acknowledged the truth of his discovery; and rash, indeed, would be the man who now would venture to call in question the value of this brightest gem on the brow of our divine science.

Harvey, with a simplicity peculiar to men of genius, disproved the arguments of his opponents, and substantiated his

views by the most decisive, at the same time simple, uncontrovertible experiments, attended by phenomena clear, obvious, and convincing. He first opened the treasure of his discoveries in a course of lectures in 1616, in which he elucidated the alternate contraction and dilatation of the heart. He calculated that it projects into the arteries about two ounces of blood in each pulsation. The question then naturally occurs, should scepticism ask, what becomes of the blood thus propelled from the heart? The answer is divested of doubt,—it circulates, else the heart must contain the vital treasure in an inexhaustible degree, which is at variance with all the laws of matter, so that as it takes the round of the circulation, it must receive that quantity previously to each pulsation. By tying the trunk of an artery he found that its branches, as well as the returning veins, were left perfectly empty. By tying a vein he found that its branches, as well as those of the corresponding artery, became gorged with blood. Besides this he argued, and proved by experiment, that, from the mechanism of the valves of the veins, those vessels must admit the blood to pass from their extremities to their termination in the heart; that, from the structure of the tricuspid valve, it must pass from the right auricle to the right ventricle; that, from the manner in which the semi-lunar valves open, it passes into the pulmonary artery. He traced the continuation of its course through the branches of the pulmonary artery to the lungs; it returns by the pulmonary veins to the left auricle; that from the left auricle the mitral valves would admit of its progress into the left ventricle, and that it would be propelled thence, passed the semi-lunar valves into the aorta, and through all its branches, and would complete the other half of the circulation by being returned by the veins.

The arguments of Harvey, supported by most clear and decisive experiment and observation, were calculated to carry conviction to the weakest or most sceptical minds. Without knowing the mode of supply to the vital current, he traced it from its great reservoir, the heart, throughout its various ramifications; and by the venous canals, which imperceptibly afford in return a necessary reflux, he produced incontrovertible evidence of a most divine arrangement, by which life must ever be maintained whilst the circulation of the blood goes on. Hence medical practitioners have an easy, familiar, and correct mode of determining, most accurately, the true state of the health, whether under the influence of derangement of the functions of parts of the system generally, or that admirable and just consent which is manifest when every organ of life performs its office in a perfect manner.

His opponents, however, when they could no longer deny the truth of his doctrine, asserted that the discovery did not belong to him, and attempted to show that some of the old anatomists had described the same; or threw out surmises that he had learned it from some one of his contemporaries, whose timidity or other avocations prevented the promulgation from the dread of a fate similar to that of Galileo, by falling into the hands of the Inquisition; such were the miserable subterfuges which the ignorant and interested had recourse to, to avoid the necessity of adopting this admirable system, and of withholding from him the meed of honour so well due. Thus Harvey had a host of adversaries. Some, humbled by his superior attainments, enviously cavilled at his opinions, whilst others withheld the acknowledgment due to the originality of his views. A clamour was raised in opposition to his great discovery; he was stigmatized as a visionary, and, pitiable to say, this delusion was urged upon the public mind by many of his own countrymen, and had the effect of almost annihilating his professional hopes; but his invaluable theory remained but for a short time unrewarded. The suffrage of mankind soon honoured him with the laurel which public homage ever gives to such transcendent talents.

The circulation of the blood being made known, it next became a subject for inquiry, what course the nutritious part of the food, or chyle, would take in passing from the intestines to the blood vessels; the labours of an Italian, named Aselli, solved the question by the discovery of a set of vessels which perform this office. The appearance of the mesentery of certain living animals unveiled this mystery; for in it was observed a series of minute vessels full of a white liquor, and from that circumstance he named them *lacteals*.

This fact being made known, every experimenter in anatomy was not sparing of animals in a living state; and either tempted to ascertain Aselli's accuracy, or with the hope of throwing a further light upon the subject of sanguineous circulation, Pecquet, in France, being engaged in this pursuit, was so fortunate as to discover the *thoracic duct*, which conveys, as the common trunk of all the lacteals, the accumulated chyle and lymph into the left subclavian vein. Thus was an important part of the animal economy satisfactorily

explained by anatomical demonstration, namely, the manner in which the nutritious part of the food enters into the circulation, whereby it becomes converted into blood, and is directed to the support of life.

The above discovery led to that of the *lymphatics*, or that set of transparent vessels which relieve nature of the superabundance of matter, by taking up the old particles of the body, which would otherwise cause impediment to the course of life, and induce disease; those, as well as fluids or secretions exposed to their extremities of these vessels, are removed into the circulating mass, thence to be eliminated by the excretory organs. On this ground also, many of the physiological and pathological phenomena of the animal economy can be satisfactorily explained.

To the celebrated Leuwenhoek we are no less indebted for the patient examination of microscopical subjects, whereby he was enabled to demonstrate the actual circulation of the blood in living animals, and to point out the red globules of the blood, and he also demonstrated the animalculæ in the seminal fluid. In this investigation he was associated with Malpighi, who gave his attention particularly to the minute structure, and chiefly to those of the *secretory* parts.

Another important advantage arose about this period, from the anxiety which men of active minds evinced to search into every thing which could aid to the attainment of the great ends of science: one is most remarkable, and indeed invaluable, namely, the method of making anatomical preparations. For this we are principally indebted to Swammerdam and Ruysch, and by their excellent inventions the whole distribution of the vascular system, which could previously be only partially traced by laborious and defective dissection, became manifest; the most minute branches could be traced, and their communications or inosculations with each other were easily demonstrated.

The ingenious contrivance of Dr. Nichols, of making corroded preparations, an idea derived from chemical research, by dissolving the fleshy parts in a menstruum, and leaving the injected vessels clean and entire, afforded results both useful and ornamental. In addition to these inventions may be mentioned that of making casts, as they are mechanically called, in wax, plaster, lead, or the softer alloys of metals. By these inventions a likeness of parts, either healthy or diseased, can be secured, and they afford an easy and excellent means of adding to those collections of cabinet treasure which are seldom to be met with, or difficult to preserve in a natural state, and are of such vast importance to the scientific world. With the preceding methods of preservation may be enumerated that of keeping the parts in alcohol, whereby also parts of the most delicate, curious, important, or useful character, consisting of morbid or healthy specimens, may be preserved. From these specimens a clear idea of diseased or disordered structure may be conveyed to the mind, which no description in words could adequately afford.

Anatomical science was greatly promoted by the early views of the Royal Society of London, formed by a club of literary gentlemen during the stormy despotism of Cromwell, and subsequently sanctioned by charter after the restoration of Charles II. The members of that enlightened society having been deprived of employment under the usurper's government, silently cultivated those sciences which have since tended to raise their country to the highest pinnacle of wealth and celebrity, and their peaceful labours not interfering with the mad politics of that period were permitted to proceed unmolested.

This time was peculiarly propitious to science: all Europe was intent on philosophical inquiry. The "royal transactions" gave a stimulus to the minds of mankind, and to the honour of the Royal Society be it remembered, that the principal discoveries and improvements made since its origin are recorded in those transactions. One great proof of the benefits resulting from the labours of this celebrated association may be adduced from the fact, that in the reign of Louis the Fourteenth was established the *Academie Royale des Sciences*, corresponding with the views of our Royal Society; but there appears a remarkable difference in the constitution of these learned bodies, as the Royal Society of London is not limited in number, besides possessing an unrestrained selection of a president, as also of a person most competent to discharge the important duties of a secretary, [an office, it must be allowed, of vast importance in all establishments of that kind.] The Society has, moreover, the power of electing, *per se*, its own members, whereas the French academy are *allowed* only a certain number of individuals in each branch of science, and these are salaried by the government, and are tied down to the duty of furnishing, as dictated, occasional essays on the parts assigned to them.

At this important period we find the

Germans not inattentive to the cause of science. The *Academia Naturæ Curiosorum* took its rise from the combined efforts of a few physicians, who had associated with the intent of undertaking each a task, suitable to his taste or talents, for the improvement of physical science. The Emperor Leopold, in accordance with the political maxim, that nothing promotes the advancement of society more than science, incorporated that society as a college, and the productions of the members, given under the title of *Ephemerides*, contributed greatly to the general fund. It must not, however, pass notice, that the writings of the German philosophers are remarkable for rather a stiff, syllogistic style, and dogmatic conclusion, than the open and easy manner of deduction from experiment. Klaproth is an illustrious exception. When the journal of the Germanic Society, which continued from 1671 to 1679, was on the decline, Nicolas du Blegny, a surgeon at Paris, started a similar publication, entitled, *Zodiacus Medico-Gallicus*, but his labours were not equal to such an undertaking, and it became defunct after a period of five years; the facts it affords are common-place, and merit no further regard.

The bones and muscles have been well and accurately described by Albinus, Cheselden, Lue, and Cowper. The vascular system has been elucidated by the splendid labour of the immortal Haller. Walker, and Meckel of Berlin, and Scarpa of Pavia, have rendered their names equally valuable in the estimation of future ages, by their having traced the distribution of the nerves most important in the animal economy. Mr. Cruikshank distinguished himself by an excellent work on the absorbent system, and Mascagni has lately given to the public a most elaborate account of the absorbent vessels, with very splendid plates. I must not, however, omit, in this place, Dr. William Hunter, who was as eminent a patron and improver of anatomy as this country can ever hold up to the emulation of surrounding nations. He published a complete history of the growth of the *ovum*, and the changes which the uterus undergoes after it has been received into its cavity, illustrated by beautiful engravings.

It is needless to say that Mr. John Hunter has a distinguished claim on the recollection of all who devote their attention to this high profession, having evinced superior powers in physiological reasoning, corresponding with the keen and accurate anatomical research of his brother, and by his labours removing much of the rubbish which, through the neglect of his predecessors, had been suffered to accumulate around the noble edifice. England may, indeed, proudly boast of him as being one of her greatest ornaments in modern science, whose powerful mind threw a splendid light over the whole field of animated nature, and proved that he was, perhaps, the greatest promoter of the science of physiology that ever lived.

The life of this eminent individual deserves to be regarded as forming an epoch in the history of physiological science. To him is to be attributed the singular merit of having laid, by experimental facts, a firm basis on which succeeding anatomists may raise, if not complete, a beautiful and lofty structure. He collected together the grandest and most instructive cabinet of any in Europe, which was, at his death, purchased by Parliament for the Royal College of Surgeons in London, thus securing the treasure to this country.

I ought not to leave unnoticed the labours of Söemmering, who has directed particular attention to the brain, the eye, and the ear; nor should I avoid calling attention to the plates of Vicq d'Azyr on the former subject; also Zinn, Cassebohm, and the illustrations of the famous and immortal Scarpa on the latter subjects.

In this hasty sketch of the labours of such illustrious men, it is a duty to mention, that Morgagni and Baillie have each published a work on morbid anatomy. It is needless to point out to the profession the unanimous deference paid to the performance of the latter. As a branch of medical science, morbid anatomy thus exhibited, particularly claims the attention both of the physician and surgeon; and the study of it will frequently prove (when existing) an index pointing to the nature of the derangement in a viscus, and the relation which one structural disease bears to another.

To conclude this historical detail, we may reflect with satisfaction on the zeal with which so many have been actuated to pursue a study so interesting and advantageous to mankind as that of anatomy and physiology, up to the present day; and as there are so many active minds engaged in exploring, with anxious care, the yet untrodden parts of this scientific path, we may encourage the hope of witnessing a continued and, better to say, an undiminished prosecution of the study, and that the present labours of many very eminent physiologists foretel discoveries still more important than

those, perhaps, which have been handed down from former ages.

Having given a brief historical sketch of the progressive advancement of anatomy from its nascent state to its present, comparatively, perfect form, I shall now give a cursory, but general outline of the structure or composition of the animal body, and a few observations upon the functions and economy of its internal parts.

By the term anatomy, we are to understand, in a general sense, a division of the parts constituting all organized bodies, with a view of comprehending their structure, and the inquiry is applicable either to animal or vegetable subjects. Referring to the examination of the nature of the human body, it is more immediately designated under the term of *human anatomy;* but as it regards the dissection of animals exclusive of man, it is called *comparative anatomy*, with reference to vegetables, *vegetable anatomy*.

Viewing human anatomy as a science, the mind has no object more interesting, and no study affords more ample compensation in the labour of investigating and contemplating the admirable correspondence and harmony of its various parts. The philosopher, in tracing out the frame of his own species, beholds the most beautiful and elaborate mechanism of parts, so symmetrically adjusted to each other, as to depend, by one continued circle of cause and effect, for an uniformity of action which empowers the individual to hold that high rank in the scale of animated existence for which he was designed. It was, perhaps, a consideration of this that led the philosophic poet to say, "the noblest study of mankind is man."

In referring to the general structure of the body we observe a fabric of bones, usually termed a skeleton, (at least in the more perfect animals,) which is of a fibrous structure, being the hardest of all organized parts, and so in fact forming the foundation or framework of the system, upon which the softer parts are built and extended; in some parts forming columns to support the weight of the body; in others firm enclosures to protect the viscera more immediately essential to the existence of the individual, most of which come under the classification of the vital organs; in most parts they afford attachment for muscles, whereby they may be considered as levers moved in different directions by the contraction of those organs. Thus, without these the vital organs would be exposed to injury, and life would be constantly in imminent danger; the body could not be built into that symmetrical figure by the adjustment and opposition of the muscles upon them far surpassing in itself any thing that could be possibly preconceived by man; and in vain would the mind convey its sentiments or intentions to the contracting muscles; they not having any firm point of attachment, confused and undetermined motions would be the result, and the influence of the mind would be rendered futile, and incable of producing effects to establish its relation with the surrounding creation.

The muscles, or the fleshy parts, amongst the strata of which the bones are buried, are likewise of a fibrous structure. These are the moving agents, by being possessed of a peculiar power of contractility. This power of contraction in those muscles subject to the will, is called volition, and those muscles so influenced are called voluntary muscles. It is this power of action, the effect of which is denominated locomotion, which forms the grand line of distinction between the vegetable and animal kingdoms; and it is by the economy which governs the well directed movements of man, that he ranks above the rest of creation and becomes arbitrator of the whole. Besides these muscles there are, however, others whose power of contraction is independent of the will, as the vital organs, viz. the heart, stomach, intestines, and also the urinary cyst,—these are called involuntary muscles. Were the actions of these organs within the range of the will the vital functions would be left to be governed by man's own judgment, and I need not say be subject to a thousand interruptions. The muscles of respiration, being in some measure influenced by the will, are said to have a motion of a mixed nature between a voluntary and an involuntary.

This power of contraction is not demonstrated to exist in any other fibrous structure, and must not be confounded with the tension of parts peculiar to the vital state. They ascribe this property to an innate principle in the muscle, termed the *vis inertiæ*, and which is regarded as the principle of irritability; but again, there is another peculiar power necessary to the production of voluntary motion resident in the nerves, called the *vis nervosa*. The nerves form a medium, or a connecting link between the softer structures and the brain, and thus communicate external impressions made by material objects to the mind, by which an action of the mind is excited, and the perception of sensation is performed; and again, by being a medium of conducting the impression made by the will

of the mind to the voluntary muscles, which impressions excite the principles of irritability and action seated within those muscles. It would not befit the present subject to enter minutely into a discussion whether there are necessarily existing two such distinct principles concerned in the production of the phenomena of voluntary motion. There are, in fact, circumstances which appear to throw probabilities on both sides of the question. I may observe that the later discoveries show that there are nerves for particular functions, a set for parts possessed with *voluntary motion*, a set for *sensation*, and a set for the *vital functions*. In conformity, likewise, with this idea, we observe the *optic* nerve adapted to the impression of light,—the *acoustic* nerve to sound,—the *olfactory* to smell,—the *gustatory* to taste.

It is most reasonable to conclude that this variation of function is partly, if not altogether attributable to a variation of structure and condition of the nerve, perhaps too intricate to be scrutinized by human investigation. We observe also a distinction that cannot fail to be remarked, kept up between the origins, the distribution, and the ultimate expansion of these different systems of nerves. To those nerves constitutionally adapted to convey sensation, the skin may be considered as merely forming a nidus to the peculiar manner in which their sentient fibrillæ most terminate. In this view of things a parallel may be drawn between the function of the latter and those for voluntary motion; the muscles form a nidus to these in their distribution, in which they exert their influence. With this view, but with what degree of correctness I will not take upon myself at present to determine, there are some who have attributed the phenomena of motion altogether to the property of the nerves, and who deny, in fact, an independent principle of motion to the muscles.

The nerves, therefore, appear to be at least the remote cause of all motion and sensation; without them the muscles would not impart to man the power of locomotion. The nerves extend between the brain and the muscles. There exists a difference of opinion among physiologists whether the nerves terminate in the brain, or originate from it. To me they seem as much to terminate in it as to originate from it; for the brain, during utero-gestation is formed subsequently to the nerves and spinal marrow; but again, in reference to the latter opinion, the active nervous principle seems to take its origin in the brain, and to course from the brain to the extremities; thus, for instance, a ligature benumbs the parts below it. Whichever be the case, it is evident that the medullary fibres of the brain and spinal marrow must be continuous with the fibres of all the nerves in common; whereby some have conceived the functions of sensation and volition must be, at some part or other, concentrated, consequently the brain will be best adapted for the seat of perception, or thought; and here it is allowable to conjecture that, as there are particular functions possessed by particular nervous fibres, the opinion that there are particular fibres or portions of the brain adapted to particular faculties of the mind seems to be corroborated. The nerves being thus supposed to be the indirect cause of all animal action, by the relation which they in their function hold with the muscular fibres, whether it is with those that constitute the substance of the more bulky muscles, before they enter into the composition of the secreting arteries, or that form the muscular structure of the vital organs—it is a great question which claims our consideration, which is the nature of this proximate cause or property possessed by the nerves, by which they communicate the impressions both of sensibility and motion. It may form a just question on what does this property possessed by the nerves influencing digestion depend, and whereby they are enabled to impart both sensibility and motion to parts. The prevailing opinion, and the one most clearly borne out by concomitant circumstances, is, that there is constantly secreted into the medullary substance, of which the nerves are principally composed, a fine subtile fluid which has a property, in a very high degree, of receiving and transmitting impressions made upon it. The constituent particles of this fluid are perfectly unknown, as they cannot be rendered visible by art, nor can their existence be demonstrably proved by experiment.

Upon applying a ligature to a nerve the motion of its fluid seems to be interrupted, or, at least, its function is interrupted, which proves that something corporeal flows through it; it is, therefore, a weak argument to deny its existence, because we cannot see it; for who can doubt about the matter of heat, oxygen, azote, because they are not visible? It is clear that the nervous fluid is not electric matter, for it does not show any signs of spontaneous electricity; nor can it be magnetised, as has been proved by experiment. I may observe also the error in supposing that property to be any thing which resides in inanimate matter; it is a property depending upon life, and di-

rectly opposed to the affinities of those which govern dead matter. I say, then, on this account it can be neither galvanism nor electricity; galvanism produces no other effect than a powerful stimulus would do; it excites muscular motion, the effect has been mistaken for the cause. The nervous fluid, then, seems to be a fluid *sui generis*, existing in the nerves, and forming an intermediate link between the body and the soul. The sensations excited by external objects, whereby its perception is roused, and thoughts are generated. There is a reciprocal reaction and the thoughts communicate certain effects upon the muscles, consisting of actions which bear a determined influence upon external objects; thus the muscles are servants to the will; thus the relation between sensation and perception, thought and volition, between the mind and the creation which surrounds us.

These circumstances may with some men give rise to the opinion that the thoughts and faculties are all produced by the nervous system, which become concentrated in the brain, which excite certain sensations upon particular parts of that viscus, and so to excite corresponding thoughts according as those parts may happen to have been constitutionally adapted to these impressions, and thus the thoughts have been vaguely supposed to depend upon material principles in connection with the bare organization of the human frame, and to depend upon the functional and structural perfection of the brain.

Structures have, besides nerves, arteries; for it is from the blood that the vital principle is primarily produced and supported. There are likewise veins and absorbents entering into the formation of the organized parts of the body. The various structures are connected together by a fine, extensible, reticulated, serous membrane called, on account of its arrangement, the *cellular membrane*. This forms a general connecting medium both to hard and soft structures, movable and immovable parts, as well as to the interstitial parts of each structure. Each part owes its structural character to a variety of causes, the principal of which I think are the following.

I first begin with the most simple form of structure, which depends upon the different degrees of density of cellular membrane, whereby it assumes the different modified forms of fascia, when extended out into a very strong stratum, possessing, however, a condensed arrangement of fibres, when collected into a narrower and more condensed and cord-like shape, forming tendons and ligaments; perhaps by forming an expansion of fibres of a greater delicacy of character; its arrangement constituting serous membrane. Again, the peculiarity of structure sometimes depends upon a peculiar substance, which, by an action natural to the organization of the part, is deposited within the meshes of this cellular membrane, as bone, and the vitreous humour of the eye; and, in fact, the nerves, that is the medullary substance. In organs of another character, it may depend upon the particular arrangement of the vessels, and, possibly in some degree, of the nerves, as the spleen, the cortical part of the kidney, and the choroid coat of the eye, depend, for the most part, upon a peculiarity in the arrangement of the vessels. Again, the structure of an organ may depend on a peculiarity of fibre, as, for instance, muscles, perhaps the cornea may be included. It has not yet been proved what its essential structure consists of, perhaps its laminæ are formed of elementary fibres, too minute in size, and intricate in their arrangement to be distinguished by common observation.

Hitherto have been described the constitution of the body in general, the phenomena and organs of sensation and volition, or what may be termed the *animal functions*, there are, therefore, remaining to be described, the phenomena of the *vital functions*, or those intended for the preservation of the species, furnishing material and a constant supply of nutriment to repair the waste of the system, effect the growth of the body, &c. This process constitutes a most important portion of physiological science, and comprehends a chain of operations—digestion, absorption, circulation, respiration, and secretion.

The crude and heterogeneous food is converted into a fresh supply for the support of life by digestion. Vegetables are destitute of the complicated arrangement of viscera necessary for this function; unlike animals, being incapable of locomotion, they are fixed in the earth, and, by means of their roots, imbibe a nutritive supply from the surrounding soil, the roots answering the purpose of an alimentary canal, so that the presence of an alimentary canal depends upon the power which animals have for locomotion.

As I at present scheme at nothing more than a general outline, I shall avoid entering into a detail of these functions, which would at this time be unseasonable—unseasonable, because their interest will be felt in a greater degree when they come to be considered at a greater length than can now be done, and, at

the same time, properly proportioned and adjusted to the particular anatomical topics which must, necessarily, hereafter come before our observation. Waiving the operations of chymification, chylification, which are comprehended in the process, I may pass on, by observing cursorily on the supposed applicability of the spleen to be subservient to the digestive viscera, it has been supposed to be adapted to the greater extremity of the stomach in such a manner that the arteries, as they enter its longitudinal fissure, will be compressed in common with the whole of its dingy or sponge-like substance; whereby the blood will be in some degree diverted from its most usual course through the splenic vein, and carried through the coronary artery to the stomach for the increased production of gastric juice, which will accord both with the excited state of the stomach, or the increased action of the arteries which its impletion keeps up. The blood, perhaps, previously to this, as it takes its course through the windings of the splenic artery, and the branches of the turgescent veins, and perhaps, moreover, by its percolation through the intervening cells between the two, undergoes a modification previously to its being brought to the liver for the secretion of bile.

The principal causes at work to effect digestion are the peculiar influence of the gastric juice, the peristaltic motion of the muscular fibres of the stomach, the animal heat, and the free action of the nervous system. It is very difficult to obtain the gastric juice in a state of purity from being naturally mixed with other secretions, as the mucus of the stomach, the bile, and even saliva, and also the masticated contents of the stomach. One of the most remarkable properties of this fluid is its so rapidly mixing with all substances taken into the stomach, and dissolving and assimilating them, whether of animal or vegetable matter, and, in the healthy state, uniformly presenting the same salubrious results, but evincing its effects most readily on animal substance. To account for this power of assimilation has hitherto evaded the most profound research, and as yet may, perhaps, afford a meed to the inquiring physiologist.

The observations on the gastric juice led me to make some remarks regarding the applicability of the *vena porta* for the secretion of bile,—from its large size, its peculiarity of arrangement and course, it is supposed to have an effect in developing the biliary constituents of bile, the elements of which are previously contained within the venous blood preparatory to the secretion; also the arterial like structure which the vein assumes when branching anew into the substance of the liver, the correspondence between the properties of venous blood and those of the bile, along with all the other peculiarities must be intended for a very particular purpose. The chief office of the hepatic artery must be to convey blood to the liver for its nutrition; its size is but little more than adequate to that effect, and venous blood cannot afford nutriment. The terminations of the hepatic artery communicate with those of the vena porta, and it is true there must be a certain blending of the blood of the two, that may give that vital energy and capability of excitement to the parts of secretion which can only be afforded by the presence of arterial blood; or it may possibly secrete an additional constituent requisite for the perfection of the bile, which becomes combined with the rest.

The food having been converted into the homogeneous fluid called *chyme*, by the action of the gastric juice, and a new production being formed from that again by the influence of the bile, being the pure and nutritious part called *chyle*, this is subjected to the absorbent mouths of the lacteals, which open on the surface of the alimentary canal, whereby the fluid is carried into the circulation, and hence the supply of the material, which becomes, by the subsequent process of sanguification, converted into the circulating blood, diffused throughout the system, and rendered fit for the nourishment of the body. It is needless to descant on the importance of the sanguiferous, or vascular system; it consists of the heart, arteries, and veins, and the functions of these connectedly perform the circulation—that process which more immediately than any other upholds life.

The heart consists of a muscular cavity, or cavities, whence the blood is propelled as from the centre of the vascular system, through the arteries, to the remotest parts of the body, and returned by the veins in a continual stream. The blood receives the assimilated fluid from the absorbents, and as it circulates through the distant extremities it effects the purposes of nutrition and secretion. Previously to the new fluid undergoing this change, or being exposed to the separatory influence of the capillary arteries it is necessary that it should be exposed to the action of the atmospheric air in the lungs, that it may be combined with and assimilated to the blood; and until this is the case, neither can it nor the blood returning by the veins afford properties fit for sustaining life, being divested of the vital

rinciple in the previous round of the circulation. May not the various and invisible modifications of structure, which the terminations of the nerves may possibly assume in secreting parts, be a means, together with the peculiar arrangement of the vessels themselves, of modifying their actions, and producing a peculiar secretion as the result?

The functions of the lungs, therefore, form an essential part of the animal economy. In the most perfect animals the lungs consist of a number of cells communicating with each other through the medium of the bronchia. The respiratory organ is cellular in mammalia, birds, and amphibia; in fishes there are gills, and in plants the organ of respiration is on the internal surface of the leaves. On the membrane of those cells the vessels are most minutely distributed, and by these vessels the blood in the lungs is exposed to the influence of the atmospheric air, and is thereby purified.

In the higher class of animals there is a double heart, each portion consisting of two cavities; one, for receiving the blood from the body and transmitting it to the lungs, is termed the pulmonic heart. The air inspired is known to contain oxygen, a proportion of which is supposed to be absorbed in the lungs, there to combine with the blood; although this would seem to complete a theory which is enchanting to the mind, because it appears, when viewed abstractedly, beautifully rational, it has been thrown prostrate by the later researches of physiologists and chemists, and which we must therefore disown. It might also have been asked, how can a combination of the two ensue, when there is both the delicate membrane of the air-cells as well as the coats of the arteries intervening? If it be said, by the exhalants,—I answer, their function is to excrete, and excretion and absorption by the same vessels are incompatible. If it be stated, by a distinct set of vessels,—I ask, have they ever been demonstrated? It cannot be by transudation, because such a thing is impossible to take place through lining membranes. It cannot be through the medium of the absorbents, else the change would occur in the left subclavian vein. The air expired abounds with carbonic acid gas; by the carbon of the dark venous blood being thrown off by the exhalant arteries in the lungs, and combining with a portion of the oxygen, the vital current becoming of a bright vermillion colour, and assuming anew the principles of vitality, is returned by the pulmonary veins to the left side of the heart, this being termed the systematic, inasmuch a it is propelled from this and is dispersed through the spreading branches of the aorta to the whole frame.

Recollect then that the animal functions consist of the faculties of sensation a d motion, as they distingnish animals from vegetables, and if animals had a resource of supply within themselves, these two faculties would be sufficient, inasmuch as these alone establish a relation between man and the surrounding beings, a term used in contradistinction to vegetable life which is destitute of sense and motion That the functions called, in opposition to those, vital functions, serve for the support of the frame, such as the offices of digestion, absorption, circulation, respiration, and the secretions.

The life of an individual seems to be proportioned to the space occupied by that series of animal functions which the wisdom of the Creator destined to be performed. The period of decay approaching to death is never seen to commence till the time of propagation has elapsed; the latter is the forerunner of the former, the life of the individual being frequently prolonged till such is accomplished; but when all the organs are fully evolved, and have discharged, or have continued some time capable of discharging, those offices for which they were designed, dissolution commences; the assimilating organs begin gradually to lose their tone, and the absorbents carry off from the different parts more than they receive in the way of nutrition. The irritable fibre then becomes rigid, and insusceptible to impression; the cartilages ossify; the bones grow harder; the smaller vessels collapse and disappear; under this diminished state of vitality, the parts are no longer obedient as before to the action of stimulants, and death ensues.

Gentlemen, the great length to which this important subject has led me, may perhaps, appear as trespassing too much upon your time, but it is one of such paramount interest, as it regards your future welfare, that I cannot conclude without adding a few observations, particularly addressed to you who are commencing, or proceeding, with your anatomical and professional studies.

In every branch of study we find that the mental powers are not distributed alike to all. Some are gifted with a readiness of conception and a rapidity of reasoning amounting almost to intuition. To these happy few I am insensibly led to offer my congratulations for the splendid talents with which nature has bene-

ficently endowed them. With these nascent and invaluable qualifications, thus placing them in an advantageous position for the acquirement of those sweets of knowledge, and enabling them, almost without effort, to collect the honied treasures which bountiful Nature has so profusely scattered for them in the flowery path of science. But, let me add, that in those natural endowments there is sometimes a deadly snare. The sunshine thus graciously shed upon them at the outset of life is too often clouded by indolence, the offspring of self-confidence; for it should be remembered, that "the race is not always to the swift, nor the battle to the strong." In proportion to the extent of the abilities thus bestowed, if left uncultured or abused, so the more lamentable will be the result. Allow me to flatter myself that none of my present auditors correspond with the latter description.

To those possessed of more limited abilities, but who have assumed the powerful characteristics of perseverance, that noble gem which sheds a lustre on every undertaking, and is equivalent in its effects to the most brilliant natural abilities, I turn with delight. The path of science may prove to them painful and thorny at first, but as they advance in their meritorious career, they will assuredly find that it will lead to the happiest results. To you I would say *persevere*, for it is exertions of that character that have advanced men to eminence not only in anatomy and medicine, but in every other branch of science. I would hold out this desirable station as being within the reach of you all, by a constant and uninterrupted course of study. Let me take, I pray, this opportunity, to force on the consideration of you all a due sense of the baneful results necessarily incurred by a wavering and unsteady line of conduct. But, in thus readily bestowing my advice, and inculcating the duties to be performed by yourselves, I must not forget, that there is a mutual relationship, and reciprocal duties, devolved upon myself. May I be allowed in a few words to express my ardent desire and determination never to prove myself unworthy of the confidence which the generous hearts of my pupils have reposed in me. I pledge myself as your teacher, your friend, and as a man, to further your studies, and to be ever anxious to promote your interests, for which I shall ever feel the strongest regard.

I cannot, however, gentlemen, take my leave of you in this lecture without observing, that I have to-day considerable satisfaction from being able to render to my pupils the superior accommodation, and those facilities for their anatomical pursuits, which their assiduity so well merits. It is to those who confided in me when, in fact, I was yet untried as a lecturer on anatomy, whom I, as well as yourselves, have to thank for these advantages. I wish, most particularly, to impress upon you the necessity of a regular attendance on the lectures and demonstrations. Professional honesty demands it; the important trusts which may hereafter be reposed in you absolutely require it; it is besides an act of honesty due to yourselves; your object is of course not to obtain a superficial knowledge—to patch yourselves up artificially to answer the questions which may be proposed during your examination at the College of Surgeons, &c.; which questions are merely intended, as far as a few questions can be, as a test of your professional intelligence. I never teach for that purpose; that at least is never my main object in teaching, nor must it be yours in learning. The great object is so to perfect your knowledge as to acquit yourselves creditably in every thing you do in your future practice. Punctual attendance is an act of duty which you owe to your friends, and an act of honesty which you owe to the community at large. I consider that I am addressing two classes of students. Those who are just arrived in town and who are only commencing their studies, and who have for their object information which is to qualify them as Apothecaries, and to pass the examination connected with it: besides attending the lectures from 2 to half-past 3 o'clock in the afternoon, it will be an advantage for you to hear the catechetical instruction of the bones, from half-past 3 till half-past 4 o'clock, as well as the demonstrations every day from half-past 10 till half-past 11 in the morning, and which will, during the first part of the course, be chiefly upon the viscera. The other class of students—those who are returned to resume their studies, and have more immediately as their objects of pursuit anatomy and surgery, and to pass the necessary examination as Surgeons, will be personally concerned in the catechetical instruction of the advanced classes. I must enjoin the attendance of all my pupils on the anatomical and surgical examinations, which are from eight till ten on Mondays, Wednesdays, and Saturdays. But, gentlemen above every thing attend to dissection; the opportunities and conveniences for it here will be unequalled, and it is vitally necessary to the professional interest of you all; this must be commenced by you as soon as

a general idea of the bones is obtained—it is the main source of anatomical knowledge, on the spreading wings of which you can soar into the higher regions of physiology, pathology and surgery.

Dr. Nuttall, gentlemen, will commence his medical lectures, in this theatre, on the 10th inst. Although I never wish to bias your minds unreasonably in favour of any individual, yet I hope his time of lecturing, which is on Mondays, Wednesdays, and Fridays, from 9 to 10, will be convenient to many, particularly as it will not interfere either with the chemical or midwifery lectures. Finally, gentlemen, whilst I have thus portioned out the work for you, I hope to convince you of my readiness to assist you better by my actions than by words.

MR. CHARLES BELL.

Theatre of Anatomy, Great Windmill-street.

GENTLEMEN,

I ought not to take my seat among you without reflecting for a moment on the characters of those who have preceded me. I am not able to pronounce their eulogy; but I will mention their names; and observe that whatever we know that is interesting and valuable in the science we study is owing to the discoveries made by these great men.

Dr. W. Hunter was the first who raised anatomy from the very degraded state in which it previously lay, confined to a few dull and dry treatises. And then there was John Hunter—need I say more? Afterwards Mr. Sheldon, Mr. Cruikshanks, Dr. Baillie, Dr. Thomas, Sir E. Home, and Mr. Brodie. And I mention the names of these men not merely to hold them up to admiration, but to remind you how much they did for their profession, and how grateful their countrymen ought to be to them for their labours.

There is another class of men who will not forgive me if I forget them—I mean the numerous students who have pursued their studies here. It is natural to think of them with confidence and pleasure, as men loving their profession and being a credit to it.

It appears to me that I shall most effectually do my duty to you, by following precisely the plans which have been so successful with my predecessors. This plan excludes, indeed, all novelty, and all attempt at it; but it places fully before the pupil what is so necessary for him to know.

Now, gentlemen, we are to devote ourselves to the study of anatomy. It must, of course, be very apparent to you, that the science of anatomy will be very differently considered accordingly as men's minds are cultivated. If they be left to themselves, to their own prejudices, they will dislike anatomy and all that is connected with it. It only brings to their recollection the loss of friends, and the end to which they themselves and all must come. But to those who consider the interests of mankind around them, nothing can be more interesting and instructive than the contemplation of the human body. For it not only furnishes you with the knowledge of a human art—an art more or less connected with many others, but it brings home to you the perfections of the great Author of your existence; it gives you the most striking instances of his power and wisdom, and it furnishes you with the just conclusion that the same power which formed continues to watch over and protect. And I say that the contemplation of the structure of the human body brings this consolatory thought more home to you than any thing in the world. It is of great importance that you should love the science; this is of importance to prepare you both for the laborious studies you must go through, and also that you may successfully encounter the difficulties of practice. Now let us make some comparisons.

If the *geologist* examines what I may call the anatomy of the earth—its structure—the changes it has undergone—the varieties to which it is subject, he concludes, that all this is to bring about what is best for those who are on the surface of the earth. But, then, this is effected by operations so tremendous, and at such a distant period of time, that he is not able to imagine that the Great Being who accomplished it can attend to so minute a creature as man. And if the astronomer contemplates the *heavenly bodies*, he finds their space so immense, so unmeasurable, that he comes back overwhelmed at the idea of his own insignificance. "Earth," to use the language of one, "appears like a heap of dust, like an ant-hill, in which some are carrying straws, and some food; but all is only a heap of dust." And is this all? Is this the only end of philosophy, to bring home to a man his own insignificance? Now, I say that the due consideration of the human structure corrects this idea. There is not a globule of blood that passes through the frame but is retained in its course, in its character, in its place by law; by the same law which holds the planets in their

course; and the one is not more surprising than the other. But, again, when we consider the structure of the human body, we find in it all that is most happily adapted to the circumstances of mankind, as the senses are equally adapted for the contemplation of the domestic circle as for the field of the heavenly bodies. From a careful examination of the external organ, we are led naturally to consider the being dwelling in a body otherwise insignificant; and then we may extend our observations to the Author of our nature. No study, therefore, will be found like anatomy, if properly pursued, as a science which gives a man that consequence in himself which is necessary to all great undertakings.

This hour is generally given, chiefly, to the history of anatomy. But the subject should be made as practical as possible, and not as you would consider it in your studies at home, with a book in your hands. There is an opinion, and it is very common among us, but which I consider as most unhappy in its consequences; namely, that the whole of anatomy is discovered—that so many ages have passed—that so many men have been employed upon it, as not to leave any thing to be discovered. But the men who lay that "flattering unction" to their minds, are either indolent, or conscious that they are not engaged in the study as they should be, and seek that merely as an excuse. As the human fabric is formed in perfect wisdom, and as our powers of reasoning are but imperfect, it is impossible we can ever arrive at perfection in our knowledge of the structure of the human body. The fact is, that when any point is discovered, new light is thrown upon the science, and a new field of inquiry is thrown open. I wish to illustrate this point; and I have a few things before me, such as a boy would have, which will assist me in this illustration. I do not say it in vanity; but I will undertake to prove that there are things the most common which have not been thought upon with a mind sufficiently philosophical; and that much has been neglected by those who have written on the subject of anatomy.

I consider that I am addressing merely Tyros, and I wish to speak for their information. Now let us look at the bones. Bones are generally divided into cylindrical and flat; this, however, is not a scientific division, for they are very various. Every thing has its use and object, and practically it is most useful. Suppose we cut across one of the bones; the thigh bone, for instance. This is called cylindrical, and this is said to be the form of strength. But the student says "they are unequal," and this he supposes an imperfection; whereas the subject, when duly observed, is most admirable. We may first ask, why is it a cylinder? and then we shall be led to observe why it is so various. Duhamel, a name known to many of you, took a piece of wood, which he rested at each end on two points; this piece of wood he divided into three parts, longitudinally; he then placed a weight on its centre,—one part, he found, resisted by its toughness, the other yielded by compression; but what is the central part? It is doing nothing, it is neutral. Now on this principle the masts and spars of a vessel are formed, by taking away weight from the centre. And this is exactly the principle by which the bones are made lighter; they retain their strength, and yet with less material. Then we say, Why is this spine here? so that the saw marks it to be the densest material of the bone. Would you pass this over? Then you would lose much. You may perceive, as you go on, something about this which argues imperfection; but as we cannot suppose the Author of our existence to do any thing imperfectly, we must endeavour to explain it. Duhamel, seeing that the other part of the wood was doing nothing, cut away a part of it, and inserted in its room a piece of harder wood, and then he found that it resisted compression. Thus when you see a spine running on the tibia, for instance, you find that it is thus able to support a greater weight in racing, struggling, &c. Having got this idea, follow it up, and you will find that instead of merely learning a lesson in anatomy which is not uninteresting, you are laying down an important principle, because, where you find the greatest power, there you find the greatest weight bears, and hence you will be able to account for most of the accidents which occur. With some, a broken bone is a broken bone, and that is all they think about it. But carrying these principles with you, you have data on which to proceed, and which will enable you to investigate. So that if a thigh be broken, an anatomical surgeon, recollecting his anatomy, without putting his hand upon the patient, knows the precise part of the bone which is broken by that force. But, Gentlemen, it is nothing following me; it must come from the labour of your own thoughts. We often lose the opportunity of drawing legitimate and important conclusions, by resting, as it were, on the generality of the subject.

There was a certain ecclesiastic who spent a large portion of his time in the

study of philosophy. Some blamed him, and others poured all sorts of abuse upon him. Whether he was right or wrong, I cannot say; certain it is, that in consequence of his philosophical pursuits, he came under the power of the Inquisition in Spain, that country which is now in such a wretched state, and where the same system is now pursued. He was dragged from his cell, brought before the inquisitors, and questioned by them as to the fact of his unbelief in the existence of a God. It happened that in coming out of his cell a straw stuck to his garments: he took it up; and when asked if he believed there was a God, he said, "If I were shut out from the face of Nature, from this one thing I should conclude there was a God."—And so from the consideration of the most minute thing, even the cylinder of a bone, we may be led, if it be philosophically considered, to the most important conclusions.

But I must not draw you into too tedious a discussion. To pass from the many proofs of skill and contrivance which we might have in the bones and in the spine, I call you to observe the structure of the *head*. In books which lead you to consider the sutures of bones, the most important things are often omitted. Now, take a skull. Perhaps you have often thought it a pity that the head was not harder, more able to endure a blow, more capable of resistance, as hard as a helmet. Why is it not as hard as a helmet?—Because the man who has a helmet suffers more by concussion, and is more liable to be knocked down, than if he were without it. If the skull had been made of such materials that the edge of a sword might be resisted by it, the blow would have stunned the organs of intellect, and the vibration would have affected sensibility. Accordingly, we find the texture of the bones of the skull is not uniform; and we certainly should not leave this circumstance uninvestigated. It has an external and an internal table. The external table is tough, firm, &c.; the internal is glassy, as its very name (*vitreous*) implies; it is friable, brittle, apt to break. Why is it not firm as the external?—Further: between these two tables there is another, (*diploe.*) The truth is, that these three tables being differently composed, and vibrating differently, are better calculated to resist pressure, and can rarely vibrate together; just as a glass vibrates if you touch it with your finger, but ceases when you lay your hand upon it. The skull of a child is soft and almost elastic; that of an old man is changed, and almost uniform in its substance. And this, some would call an imperfection.' But it will b found on inquiry that a child scarcely suffers from concussion in proportion to an old man.

Now, mark this fine indented line, which is called the *suture*. This may be called accidental—the result of chance. There is no such thing as chance, it is all design. See how curiously it is indented, dove-tailed! Was there ever work so curious or admirable! And then look to the inner surface. And why is not this the same? If this texture and workmanship be adopted in the outer part, and if it be a perfection, why is not this inner part so too? I will suppose that a workman had to join a fine piece of wood, of which he was to make a box; when it came home we should find it most curiously indented, dove-tailed, &c. according to the rules of the art. But in working in stone it would be far otherwise; the edges would be merely joined together. The one is a tough material, which admits of all this dove-tailing, &c., the other is a brittle substance, and if the workman were to dove-tail that, the first vibration would shake it to pieces. Now, when we consider the formation of the skull, we shall find that this variety is not the result of chance. The inner part is like glass; the outer is tough, and the manner of joining them is accordingly. Again, we observe one part of the bone shelled over the other; and is this chance? Why are the temporal bones laid over the parietal, &c.? If it be mere accident, why this uniformity? Suppose a house to be overloaded with roof, the walls would be spurred out. And why are means used to prevent this? When these beams appear so strong and so sufficient to support the weight of the roof, why are transverse or tie-beams added? Because if they were not, it would spur out the walls of the house, and the roof would tremble. It is exactly the same with the parietal bones; they are not left unsupported, but have, as it were, a tie-beam. Thus the sphenoid bone is placed, and then the temporal bone takes hold of it, and presses it together, and the reason why it runs across, is, that it may take the support of the whole. When I look at the thigh bone, I find it thickened and strengthened towards the part which requires strength; and so it is with the skull. And when a man falls on the vertex of his head, or receives a blow from a mallet, it is like an additional weight on a house, and the part most to be feared is the temporal angle of the parietal bone, and this is the part where the fracture would lie. The lower or temporal angle of this bone (the parietal) is locked into the embrace of the temporal bone, in order to bind the

blones of the cranium together, and that it may be held and be restrained from rising and separating from the dura mater, which it would do on every violence don .o the cranium, were it not for this mecha nism. Indeed, in severe injuries to the upper part of the skull, so great is the liability of this lateral part of the cranium to yield, that fracture will take place, and extravasation will be found under the parietal bone, while the temporal bone still holds the lower angle of that bone firm in its place.

It argues a low conception of this sub-ject, when authors attribute the formation of the *sutures* of the skull to accident, or to the manner in which the bone is ossified, and this because they see in one part the perfect suture, and in another the simple line of union. This very circumstance will prove design, and an obvious regard to the pressure to be sustained by each bone of the cranium. The sphenoid bone is a very essential part of the *carpentry* of the skull, and by it the lateral walls are joined as by the *tie-beam* of the centering of an arch.

In the manner in which this bone (the parietal) sits down upon the temporal bone, taking advantage of the resemblance suggested by the word *paries* or *wall*, there is a remarkable similarity to the groining, which is the foundation of a wall in masonry. For, as a high wall cannot stand upon a foundation not broader than its summit, certain offsets are constructed, which, by enlarging the diameter of the masonry at the foundation, give it a base proportioned to its height, and consequently to its weight. Again, these bones (the temporal) are like the abutments of the arch of the parietal bones; and it is ascertained that a curved rib or bar of cast-iron will, with abutments, bear double the weight that it will do without it. From this it is evident, that if a boy tand upon his head, the temporal bones sustaining the extremities of the arch of the parietal bones (now inverted) will be capable of sustaining the whole weight of the body; but if the abutments of the temples were removed, the arch of the parietal bone would sink, the sagittal suture would sink in, and the temporal processes be spurred out.

I will compare the skull to a bridge or to the dome of a church. Now, if we perceive any remarkable clumsiness in the form of an antique bridge, we generally find it is to support some erection; the arches would be spurred out if they were not thus strengthened. It is so in the Gothic arch, the forms are not merely fantastic; they go on this principle: a sort of spine is raised to sustain a certain weight, and if the bulky appearance is reduced, it is by the introduction of smaller arches. So it is here; the whole art is to give strength to the arches; this is the weakest part; this must be sedulously guarded. And so it is; or, it is like a dome: this is very difficult to raise and to support. The dome of San Sofia fell three times while erecting. That of St. Paul's is admired for its security more than even its workmanship. A circular dome is to be built; but how is the lower part to sustain the weight? As soon as the men attempt to raise it, it bulges out. It is, therefore, found necessary to hoop it round with iron or strong metal. And in this dome, the skull, we meet with this principle. The temporal bone joins the parietal, &c. and all the rays are fixed one in the other. And that part of the bone which is visible, and that which is invisible, each embraces its fellow on the outside and on the inside; and though all seems accidental, all is the result of design. Now, if all these things be carefully observed, principles may be founded on them. The care with which nature has thus defended the lower parts, proves that those parts require protection; this is the weakest point, this is most likely to suffer injury. And practice and experience prove all this.

I hope I have made these points so familiar to you, that you will perceive the study has not had always that attention which it deserves. And if in this one part so much has been left unnoticed, what think you may be the state of the arterial, the nervous system? Believe me, it may yet be full of novelty.

I would just observe, that before we go into the minuter parts, it will be proper to take a general view of the anatomy of the whole body, that we may be better prepared to enter int closer inspection.

[We have to apologise to Mr. Bell as well as to Mr. Headington, and our readers, for the comparatively imperfect manner in which their lectures have been reported, arising from our inability (in consequence of the great number of lectures delivered at the same time) of procuring professional gentlemen to report them.

MR. GREEN.

Theatre, St. Thomas's Hospital.

GENTLEMEN,

In my present Introductory Address, it is my purpose to set before you the objects of the ensuing Course of Lectures, and in giving a concise view of the whole subject, to point out to you a method of study. Anatomy means, etymologically, nothing more than cutting into parts; but we mean something more than this. With us, anatomy means the art of separating and distinguishing the constituent parts of an animal body. It is the science which teaches the structure of organized bodies, not merely by the use of cutting instruments, but by the aid of various collateral branches of knowledge. It includes a knowledge of the form, structure, texture, and composition of all the parts of which an organized body is composed, whether the subject of the science or art be man, or the inferior animals; whether, in short, it be human or comparative anatomy. The object of our present Course of Lectures is human anatomy, and therefore the structure of the inferior animals will be only occasionally and incidentally introduced by way of elucidation. In order to make a Course of Lectures of this kind as profitable as possible to those students who mean to make it subservient to the practice of medicine and surgery, we shall not confine our attention to a dry detail of the structure of parts, but we shall likewise combine with the anatomical details, an account of the use and economy of the several organs, and we shall not consider our duty perfectly discharged, until we have explained the changes which the structure of the body undergoes in consequence of disease. In fact, the object of the Course will be threefold; it will include anatomy, or the structure of parts; physiology, or the economy of organs; and pathology, or the doctrine of the diseases to which the human body is liable. At the same time, in speaking of pathology, I have to observe, that I shall confine my attention principally to such diseases as produce an alteration in the structure of parts, and to those which require the aid of the surgeon.

It has been usual, in a Course of Lectures of this kind, to commence by tracing the progress of the science from its earliest and rudest beginnings through all its different stages of improvement, up o that most perfect state in which we are enabled to treat of it; in other words, to give a history of the science. This is a course which has manifest inconveniences, because it pre-supposes a knowledge which beginners cannot possess, and I therefore consider it most advantageous to defer the history of anatomy and physiology until the conclusion of the Course.

Gentlemen, the study of the fabric and functions of the human body is so delightful in itself, so interesting in its details, so pregnant with important conclusions, that no one, not wholly insensible to the pleasures of thought, and the love of truth, will require much argument to induce him to apply himself to it. In fact men, in all ages, as far as their knowledge extended, have dwelt with pleasure on this subject, and have expatiated with delight on the curious disposition of the parts of the human body—on its beautiful symmetry and proportions, and on the nicely-balanced harmony of its functions. Not only anatomists and physicians, but poets, philosophers and theologians have expressed themselves in terms of admiration on this subject, and have drawn theories to serve their purposes from the structure and economy of animal bodies. But it is not on grounds of such general interest that I have to direct your attention to this subject. It will be my duty to point out to you the importance of this study as connected with the practice of medicine and surgery. It will be my duty to show you that a knowledge of disease cannot be obtained, without principles derivable from the science on which I have to address you; that in fact an accurate knowledge of your profession cannot be gained without first directing your attention to anatomy and physiology. It is happily in the present day an exploded opinion, that a knowledge of anatomy is not necessary for the treatment of disease, and one is only surprised that such an opinion should ever have been entertained. Such, however, is the fact, and we can only suppose, that such an opinion was held by men interested in giving to ignorance the consequence due only to knowledge. It is evident that we must in the first instance pay attention to anatomy, and it will not be very difficult, by the help of an illustration, to place this in a clear point of view. For how, in fact, do we recognise disorder, disturbance, disease, or injury? We know it, because there is an interruption to the natural functions of the part. If, for instance, we observe that a joint, which ordinarily can be moved in a free and unconstrained manner, can only perform its motions with difficulty, imperfectly, and with pain, we are at

once aware that something is amiss, and that there must be some disease or injury in the part. But we cannot understand this, unless we are previously acquainted with the functions of that part, nor can we understand its functions, unless we are aware of the anatomical structure of the part.

This is a very simple instance, but the same observation applies to other cases. Let us take one of a somewhat more complicated nature. You are all of you more or less acquainted with the heart; it is the organ into which the blood is collected, and by means of which it is propelled through the blood-vessels to the different parts of the body. This is the office of the organ, and its structure is admirably adapted for this purpose. It is divided into different cavities and compartments, composed of muscular fibres, capable of emptying it of its contents and propelling the blood onwards. In the interior are various valves for the purpose of preventing any retrograde direction, and promoting the due course of the blood. Now, let us suppose that some part of this mechanism becomes disturbed; that a valve, for instance, is so altered in structure, that it no longer maintains the due course of the blood, and that the blood, instead of being propelled onwards under the natural functions of the part, falls back again and accumulates within the organ, in consequence of this defect in the office of the valve. What will be the consequence of such a derangement in the mechanism of the part? In the first place, there will be an accumulation of blood in the organ, and an enlargement of the cavity in order to accommodate itself to the increased contents. In order to make up for the deficiency in the propulsion of blood, the parietes of the organ will contract in a greater degree; but in the progress of the disease this remedial power of increased contraction will be only irregularly and imperfectly exercised. What is the next consequence? The blood, which before flowed towards the heart, becomes accumulated in the large vessels near it; hence a difficulty in the transmission of blood through the adjacent parts, and especially the lungs. Suppose a person brought to you who is labouring under this defect, what do you observe? You place your finger on the chest, and you find, perhaps, that the pulsation of the heart is no longer felt in the usual situation; it is probably lower than ordinary in consequence of the increased size of the heart. You find that the pulse no longer maintains its due regularity; it is more feeble though more frequent, often intermitting and irregular; under the increased excitement the patient often complains of a fluttering in the chest, and from the want of a due transmission of blood through the lungs he experiences difficulty of breathing. Prepared with a previous knowledge of the structure and functions of the organ, you will at once comprehend the nature of the case, and the whole of these symptoms will be perfectly and clearly explained to your mind. You will know, from the symptoms and indications under your observation, that a morbid alteration in the structure of the organ destined for the propulsion of the blood has taken place. In this way, armed with anatomy and physiology, you will find diseases in all their forms for the most part easy of detection, and often equally easy in their cure, though the instance which I have just mentioned is one of those which are irremediable by art.

It is not only in the diagnosis of diseases during life that anatomy is thus important; there are many diseases the nature of which we cannot in the present state of our knowledge determine during life; and in cases where they prove fatal, an examination of the body after death often elucidates what was before obscure, and enables us to know what change has taken place from disease in the form, colour, and texture of the organ which was the subject of it. All writers have concurred in stating the great advantages derived from morbid anatomy in giving an accurate knowledge of disease, and enabling us to found upon that knowledge a rational and appropriate method of treatment. I cannot therefore recommend you too strongly to embrace every opportunity, after having watched the progress of disease during life, and attended to the effects of the remedies employed, to examine the bodies of those who die from the insufficiency of art, in our present state of knowledge to effect their cure. But, Gentlemen, if morbid anatomy is of importance to any branch of the profession, it is most especially so to surgery. It is only by constant and frequent dissection of the dead body that we acquire that confidence which is so necessary in operations; it is only by dissection that we acquire the knowledge which enables us to plan and to provide for all the steps of an operation, and that we are prepared to meet with all the accidents and delays inseparable from its execution; it is only by dissection that we are enabled to note the reasons why an operation may not be undertaken; it is only by dissection that we learn where we may act with freedom and dispatch,

and where we must proceed with the utmost circumspection and delicacy for the safety of the patient; it is only by dissection that we acquire that dexterity in the use of the hand and knife which marks an able operator, and the want of which is a disgrace to any one calling himself a surgeon.

If it were necessary to enforce this argument, I would only call upon you to compare the present state of surgery with what it was formerly. You will find that all the great discoveries and improvements in our profession have resulted from a more accurate knowledge of the structure of the body, and a more enlightened view of the functions of the different organs of which it is composed. In fact, the detection of disease, and its treatment, are impossible without a knowledge of anatomy and physiology; and though ignorance may for a while escape detection, cases must infallibly occur which must soon expose any pretender to science; strip him of his borrowed plumes; subject him to the contempt, if not the resentment of those who may have entrusted their lives to his care, and make him feel but too late the want of that knowledge, the acquirement of which prudence as well as honesty ought to have dictated.

It is not necessary to enlarge further on this subject; I trust I have said enough to convince you that there exists an absolute necessity for acquiring a knowledge of anatomy, and I shall now proceed to take a general view of the subject of the ensuing course of lectures.

In the first place, what is the subject which we have undertaken to elucidate? It is, you will say, Man; you require a knowledge of human anatomy. But there are some preliminary considerations, to which it is necessary to advert. Let us, in the first place, consider man as a living being. If you look at the various productions of Nature, you must very soon make a distinction common to the scientific and the vulgar, I mean the distinction between animate and inanimate beings. It is difficult, perhaps, strictly to define, and draw the limits accurately, marking the boundaries between the two, but they are so distinct in character, that we cannot hesitate to admit the propriety of the distinction. Thus we consider as inanimate the solid globe, formed of metals, earths, salts, and all those bodies of which chemistry gives us a knowledge, whether continent or island, whether levelled as plain, or excavated as valley, or elevated as mountain; in the same class we include the air which we breathe, and the waters, whether collected in ocean, sea, or lake, or permeating the globe as rivers. All these bodies we have no hesitation in calling inanimate, nor do we hesitate to consider as living bodies the vegetables which cover the surface of the globe, and the animals that find a habitation on its surface, and sometimes beneath it, that live in the waters, or sport in the air. But what are the characters by which the two different classes of bodies are distinguished? It is not difficult to point these out. In inanimate bodies we find, first of all, those phenomena which are referable entirely to the matter of which they are composed, or the mass connected by that matter; phenomena, resulting from the general properties of matter, which we call mechanical, such as attraction, repulsion, force, velocity, gravitation. Secondly, we find phenomena in inanimate matter produced by changes, which are the objects of chemical science in the various combinations, decompositions, and properties which result from matter, considered as of different kinds; as, for instance, a metal differs from an earth, an alkali from an acid, and so on. Thirdly, we find phenomena resulting from certain external agents, such as heat, electricity, galvanism, which produce changes in the mass, or materials of which the body is composed. Further than this, we can state nothing as producing the phenomena of inanimate bodies; these phenomena result, in one word, from the materials of which they are composed, or from the influence of external agents which control them. But what is the case in living bodies? Here we are very soon convinced of the existence of something acting from within, and determining the phenomena produced. Here we find changes not referable to any properties of matter, of which the bodies are composed, nor to any chemical action, nor to be explained by the influence of external agents. There is, in short, an internal principle; it matters little what we call it, whether the principle of life, or the law of vital action. The latter term is, perhaps, preferable, because we avoid by it all metaphysical jargon about the substantiation or impersonation of what entirely eludes any attempts of this kind. Let us recognize it, then, as a law determining the phenomena met with in animal or living bodies. This principle or source of action is manifested by phenomena very different from those produced in inanimate matter.

One of the most striking characters of living bodies is, that they are supported by nutrition, and increase by growth. All living bodies have a power of converting substances into materials similar

to those of which they are composed, by the process of assimilation; and these materials are so disposed of as to increase the bulk of the body, and produce growth.

A second very remarkable character in all living bodies is, that they have originally a certain determinate form, and that they have a power of afterwards re-producing this form, under certain limits, when it is injured or destroyed. This is the power exerted in the reparation of lost substance, which is best observed in the inferior animals. It is that which is designated the *nisus formativus* by Blumenbach, an eminent physiologist, whose inquiries are characterised by those enlightened views for which the science is mainly indebted to Mr. Hunter. To take one illustration which may serve for all, you may readily find, at certain seasons, in stagnant pools, the animal called a polypus. Its structure is a hollow tube, closed at one end and open at the other, like the finger of a glove, and the upper extremity is furnished with radiated tentacula, or feelers. If you cut off these feelers repeatedly, they will be reprodnced in a few days; and if you divide the animal into several parts, each part will become a perfect body; thus affording a remarkable instance of this power in organised bodies to reintegrate themselves, as it were, or to re-produce, within certain limits parts which have been injured or destroyed.

Another character peculiar to animal beings is, that they have only a limited period of existence; it is terminated by that phenomenon which we call death, and which Mr. Hunter was pleased to call the last act of the living principle; as much as to say, that it is not simply a cessation, but a determination from within, like all other vital acts, of the period of existence.

But as animal beings have only a limited period of existence, they have another most important characteristic, namely, that, though the individuals perish, they have a power of continuing the race. That is to say, by seeds, by slips, or by ova, every animal being can become the parent of a future stock of the same kind. Such are the characters which we observe in all living beings, whether vegetable or animal, and in animals there are superadded sensation and motion. By sensation animals acquire a power of becoming acquainted with all external objects, or at least, if not with the objects, with the circumstances in which they are placed, as far as is fitted to their station of being. The power of locomotion is the correlative of sensation, and enables the animal to withdraw itself from those causes which produce pain, or which are calculated to act injuriously upon it, and to seek the means of existence and enjoyment. And thus animals acquire, by sensation and motion, a higher station of existence.

These characters are manifested by certain determinate actions; but here, also, there is another very curious fact with respect to animal beings; and this is, that although animal life is manifested by certain determinate actions, yet, as far as we can tell, life may be continued, though these actions may be suspended, or at least without any actions cognizable by our senses. Let me call to your mind a seed, which may be kept for months and years, and upon exposure to the warmth of the seasons, springs as it were into vegetable life. In like manner an egg may be kept for days and weeks, and though for that time vital action is suspended, if it be exposed to the warmth of incubation, a series of changes takes place under which the chick comes to life. Nay, more than this, not merely embryos, but animals which have perfectly enjoyed existence, may have their vital actions suspended, and restored again after a great lapse of time. This phenomenon is especially observable in certain microscopic animalculæ. Blumenbach kept for several years one of those microscopic animalculæ called *verticella rotatoria*, (from their being furnished with a set of fasciculi by which they perform a rotatory motion,) in the inside of his watch-glass. It was at the end of seven years, I think, that he applied a drop of water to the animalcula, when it began to move and perform its evolutions as briskly as if its motions had never been suspended.

I have thus stated the characters which are sufficient to enable us to recognize a living being. It is maintained during life by nutrition, and increased by growth; it has the power of restoring injured or lost parts to a certain extent; the period of its existence is limited, but though the individual perishes, the race is maintained by propagation or generation; farther, it has sensation and motion, and these phenomena, manifested by certain determinate actions, may be suspended for a time without annihilation, and are all under the guidance, direction, or control of an internal principle, which we call the law of vital action. These are abstracted, general circumstances, to be observed in all animated beings, from man down to the lowest mite of the creation; but we find different phenomena presenting themselves in an inexhaustible variety of forms, and probably in the

greatest perfection of combination in man.

It will be right, perhaps, in this place to notice very briefly the assemblage of organs in and by which these phenomena are manifested in man as a living being. First, for his nutrition and growth food must be supplied, as afforded in the animal creation. This food is first subjected to the process of trituration by means of the teeth, mixed with the saliva, and formed into an easily-swallowed bolus or paste, which is conveyed through a membranous tube into the stomach, an important cavity, destined to produce a change in the food for the purpose of assimilation. It is here acted upon by a fluid secreted by the coats of the stomach, and converted into a pulpy mass in which the original character of the articles of food is in a great measure lost, and from the stomach it passes into a long tube called the intestinal canal. In the upper part of this tube it is mixed with other fluids, the bile, and pancreatic juice, and converted into a cream-like fluid called chyle, which is conveyed onwards through the intestines, taken up by the absorbent vessels, and thence conveyed to a large vessel which runs along the front of the spinal column called the thoracic duct. The blood is as it were the store-house for the fresh materials of the body; from this fluid are derived all the materials for its support and growth, as well as for its reproduction. It is necessary for the purposes to which the blood is to be applied that it should be conveyed to all parts of the body, and this is effected by the heart and arteries. The heart is the central organ of circulation, and the arteries, branching out like a great tree, convey the blood to all parts of the body. Some portion of it is deposited for the purpose of nutrition, another for that of growth; in some parts it is employed in pouring out a fluid for the purpose of lubricating the joints; other portions of it, the retention of which might be noxious, are thrown off in sweat and urine. But all the blood is not so expended; a part still remains, which is taken by the veins. The veins are a second set of blood-vessels, beginning from the extremities of the arteries, contiguous with them, collecting into larger branches, and these into trunks which convey the blood that is not expended, back again into the heart. The blood of the veins is of a very different character from that of the arteries. The blood of the arteries is of a bright florid colour: that of the veins is of a dark purple colour; and is not fitted to answer the purposes to which arterial blood is destined. It is noxious to the system, and if it were carried to the brain, it would destroy life. It is necessary that venous blood should undergo a purification before it is suited to the purposes of arterial blood. In the heart the two kinds of blood are not intermixed; that organ is divided into two sides or cavities, in the left of which is the bright florid blood, and in the right the dark coloured blood. From the right side the dark coloured blood is conveyed by vessels adapted to this purpose to the lungs, a spongy body occupying the chest, and it is by the process of respiration that the purification of the venous blood takes place. In respiration, air is taken in, which passing to the lungs comes within the influence of the blood, and they then readily re-act on each other. By this means the blood gets rid of a certain quantity of charcoal or carbon in a gaseous form, which is thrown out by the breath in expiration; it assumes a florid colour, is conveyed to the left side of the heart, and then goes the round of the circulation as before. In this way the materials for the support and growth of the body are disposed of.

Another important function of the animal body, is that by which the race is provided for, to which purpose the organs of generation in the two sexes are destined. These of course do not admit of a general description, and I can at present, therefore, only briefly advert to them.

If man were possessed only of the organs and functions which I have hitherto noticed, he would be little better than a plant, or, at most, he would be but little elevated in the scale of being above the rank of an oyster. Man is destined to be an intellectual being, a moral agent, and he must, therefore, have organs, and a structure corresponding to these endowments, or which render the exercise of these endowments possible. In the first place, as an intellectual being, he is to become acquainted with all the objects by which he is surrounded, and to acquire a knowledge of all the circumstances which influence or act upon him. For this purpose he has the organs of the five senses; parts of curious structure, which admit of no other explanation in this brief description, but that the eye is adapted to receive the impressions of sight, the ear those of sound, the nose those of smelling, the tongue those of taste, and parts of the skin those of the touch. These are sufficient to render him acquainted with the appearances of external objects, and to raise such influences as those objects are calculated to excite; but the impressions produced upon the senses must in

some way be communicated to that immaterial principle within us, commonly called the soul. There must be some part which is, as it were, the condition of the manifestations of that principle within us, and it is obvious that this part is the brain. This is a part of very complicated structure, with the functions of which we are not at present very perfectly acquainted; at least we know that it is the condition of the reception of influences from without, as it is the condition of the propagation of the influences of our thought and will from within. From the brain proceed chords of a fibrous structure called nerves; these are, as it were, internunciatory chords between the brain and the organs of the senses, transmitting the influences of impressions from the senses to the brain. Other influences again are transmitted from the brain, and it is these which distinguish man as an intellectual being, and an active moral agent, destined to re-act upon the material world, to mould it to his pleasure, to cultivate that which is profitable and useful, and to carry into execution the higher mandates of his moral will.

To these purposes are subsidiary the organs of motion, bones, and muscles. Bones may be called the frame-work of the body; they give figure and protection to the soft parts, and as they are destined for motion, they do not form one rigid structure, but are numerous, and so disposed as to act easily one upon the other, as their motions are determined by the motive organs, the muscles. Wherever one bone acts as a point of support upon another, the point is covered by a highly elastic substance, called cartilage. At these parts the bones are bound together by strong elastic chords called ligaments; these chords are so strong that it very commonly happens that the bones more readily break than the ligaments give way. The articulated surfaces are lubricated by a secretion called synovia, and they are included within a capsule. The muscles are fibrous bodies, which have a power of contraction, which contraction is determined by volition, while the influence of volition is conveyed by the nerves. Thus we have brought you back again to the same point; from the brain influences are sent by the nerves to the muscles for the purpose of producing the motions of the body. All these parts are united together by a soft membranous substance called cellular membrane, and lastly they are enveloped or covered by common integument.

I have thus given you a very brief, and therefore an imperfect description of the structure of the body, which I shall hereafter examine more in detail. This examination will in fact form the body of our course. The order in which I shall examine these parts is not precisely the same which I have followed in this general view of the subject. I shall in the first place take a general view of the structure of those parts which are generally and universally met with in the body. I shall consider the vessels in which the blood is conveyed, the arteries and veins, and those which are calculated to take up the nutritious parts of the food, the absorbent vessels. I shall proceed to examine the common connecting medium, the cellular membrane, and the nerves. All these parts are more or less met with in every organised structure of the body; others are not in every instance so generally met with, such as muscles, glands, and bones. After a general view of the subject, I shall enter into a detailed examination and description of the bones, the muscles, the brain, and of those important viscera of the body, the organs of circulation and respiration, the heart and lungs. I shall next proceed to the organs of digestion, the organs destined for the formation of urine, the organs of generation in the male and female, the different vessels, arteries and absorbents, the nerves, and lastly the common integuments. All these parts will be demonstrated on the recent subject, and they will also be displayed by the aid of preparations. Preparations are exceedingly useful in a course of lectures, inasmuch as they exhibit circumstances which it would be otherwise difficult, and in many cases impossible to present to the eye of the student. They are also very useful, and indeed necessary, in exhibiting the minuter structures of the body. They will be handed round the theatre, so that you will have an opportunity of examining them in your own hands, but I have to request that you will be extremely careful in handling them, since they have been collected at a great deal of expense and trouble, and in many instances could not be replaced. After having thus described the structure of all the parts of the body, I shall explain the economy and functions of the different organs, and I shall conclude with a description of the diseases to which the body is liable, chiefly with a view to the surgical treatment of these diseases. I shall, likewise, in the course of the season deliver a lecture on the changes which take place in the gravid uterus, and the operations of surgery will also be demonstrated.

This will form the whole of the course, and I have only in conclusion to make a

few remarks which may be useful to you. It is perfectly obvious that a course of lectures cannot be profitably, unless uninterruptedly attended. It may not, perhaps, be quite clear to a beginner, that he ought on no account to miss a single lecture. He may suppose that what has been explained in a single lecture may easily be regained at some future time; but the omission of a single lecture may so break the chain of inquiry, as to render to a certain degree all that follows unintelligible. For the same reason the attention should be constantly kept up during any single lecture, for if it be allowed to wander for two or three minutes, in that time the very point may have been explained on which the whole interest of the lecture depends, and all that follows may become unintelligible. This interruption of the attention may happen from a cause which the student will not at once perceive, from an injudicious manner of taking notes. Now notes are certainly extremely useful, if properly taken, but it often happens that beginners, while they are endeavouring to take notes of what has been said, forget to direct their eyes to the anatomical demonstration which is going on. If notes be taken, they should be extremely short; they may be re-written more fully at home, and in this way become very valuable. Notes taken in this way not only serve to keep up the attention of the student during lecture, but they lead him to select those topics which it is most essential to impress on his mind, and in re-compiling them at home, he is enabled to ascertain what he may have forgotten, and to reconsider what he may not have distinctly understood. Short-hand notes are of very little use, for though the student may perhaps, by the aid of short-hand, take down nearly every word which the lecturer utters, yet, from having his attention constantly directed to his notes, he forgets to make use of his eyes, which in learning anatomy is of the utmost importance, while at the same time he has never thought of the connexion or meaning of a single subject which has been explained. It is not merely by a set of words that a thing can be clearly conveyed to the understanding, the connexion of the whole subject must be constantly borne in mind, and examined again and again in all its parts. When attending to a lecturer you think, perhaps, that you understand a subject because the lecturer is clear; but, when you attempt to explain it to another in your own language, you find that you do not understand it, or that you do not retain an accurate recollection of what has been explained to you. I do not think that any advantage is to be derived from reading on anatomy, when you have not previously had an opportunity of seeing the parts. Anatomy is a thing directed to the senses; it must be acquired by the use of the senses, and reading, previously to such an examination of the parts, is apt to convey erroneous notions, which it is afterwards difficult to get rid of. When the student has seen the parts, and gained some fundamental knowledge, he may undoubtedly enlarge his knowledge by reading. But it is not by attending lectures any more than by reading that a knowledge of anatomy can be gained; it can be acquired only by actual dissection. Your own senses, and your own observation can alone fix and impress upon your minds the objects of anatomical study. I will not say, proceed at once to the dissection of parts without any previous acquirement or knowledge, but I will say, see the parts first in the theatre, and then proceed to the dissecting-room. Furnished with this previous knowledge, you will be enabled to dissect to advantage; and, as Sir Joshua Reynolds said to the student at the Royal Academy, "Never let the port-crayon out of your hand," so I I would say to the medical student, "Never let the dissecting knife out of your hand." The objects of knowledge, for the acquisition of which you are come to these schools, are so multiplied and so various, that you will certainly find a difficulty in availing yourselves of all the advantages which our Institutions afford. As far as we are able to give you a digested plan, and to assist you in your studies, we will do it; and it certainly requires unceasing vigilance, and great discrimination to select what is most important for you to acquire. First and foremost, however, it is incumbent upon us to direct your attention to anatomy, for this is the foundation of medical knowledge. Above all things I would say, be diligent; it is the least return you can make to those who have given you the opportunity of prosecuting your studies. It is the only road to that knowledge which will enable you to practise your profession with profit and with reputation. Ignorance in the medical profession is not only disgraceful, but it is criminal; knowledge and skill in it, on the other hand, are deserving of all the honours which society can bestow.

MR. MACARTNEY AND ERINENSIS.

To the Editor of THE LANCET.

SIR,—Though we do not hold that a writer is bound by virtue of his office to accept the challenge of every disputant who may aspire to the distinction of controverting his assertions, we conceive that an appeal from any decision coming from us, by so respectable a character as Mr. Macartney, could not be passed over in silence without some disrespect to him, and great injustice to ourselves. We trust, therefore, that he will consider this reply as an additional testimony of the estimation in which we hold his worth, and of the value at which we rate our own reputation; for did we not suppose that it might suffer from the censure of so high an authority, the readers of this Journal would certainly be spared the perusal of a discussion on the contents of a letter which cannot be characterized without a breach of manners. Fortunately, however, the question at issue is one which can be adjusted without asperity on our part, Mr. Macartney's letter containing in itself the materials of its own refutation. We shall first state the passage in a "sketch" of that gentleman, to which he objects, and next his own observations upon it, that the reader may be enabled to judge whether the text would justify the comment. We had been alluding to the conduct of the Irish College of Surgeons towards that gentleman, when the following sentence occurs: "It is more probable that the consequent admissibility of his (Mr. Macartney's) pupils to an examination at York-street under such circumstances, (his having obtained a diploma or honorary degree from that body), a privilege which is now denied, but we believe upon illegal grounds, was the real cause of refusing him a worthless title." To this Mr. Macartney replies: "From the last letter of Erinensis, it might be supposed that the Royal College of Surgeons in Ireland had refused, or would refuse, to admit an apprentice of mine to an examination." He further adds, that he has taken legal advice on the subject, and quotes the words of the charter in support of his opinions, and also affirms, that the Court of Examiners have always acted in conformity with this interpretation; that such, in short, has been the usage of the College.

Now, it is very strange that Mr. Macartney should be at the expense of consulting the first legal authorities in Ireland, upon a matter which he represents in his letter as divested of all difficulty; that he should violate his proverbial economy, by the wanton expenditure of fees upon Messrs. Plunkett and O'Connel, to obtain information on a question which the *usage* of the College had rendered it unnecessary to litigate. Why call in the aid of the law, where it is said there was no resistance offered? Why provoke hostility, or employ force, in a case where we are told there was no cause for aggression? Why hold out a threatening array of red tape and parchment from the Court of King's Bench or Chancery, to frighten the peaceful, unoffending, tenants of the York-street citadel to a surrender, which a previous submission must have made superfluous? But, of all men, why should Mr. Macartney be the author of such an unwarrantable invasion of conceded rights; he who has been treated with so much deference; he, whose apprentices would be admitted to an examination; he, who represents himself as the special favourite of that ill-treated body, the Irish College of Surgeons? Was ever man so eccentric in his gratitude, so unfortunate in his social relations, so singular in his ideas of equity, as this versatile being who signs himself James Macartney? whose language, cast into a logical mould, will give the astonished reader the following result:—"The Royal College of Surgeons in Ireland would admit my pupils to an examination; but, least they should not do so, I will take care to compel them by law, as a reward for their civility."

Never, we believe, were the olive-branch of peace and the sword of war so incongruously combined in any former exhibition. Could Mr. Macartney be ignorant of the meaning of the sentence to which he objects? Could he not perceive that it was intended for general, not for particular, application; to describe the feeling of a certain body upon a subject of much importance, not merely to point him out as the sole victim of a violated charter? He could not have resided so long in Dublin, and not know that the usage of the College was contrary to what he has stated it to be. We cannot, from our own experience, or from the inquiries which we have made, state that the apprentice of any surgeon not a member or licentiate of the College ever obtained a diploma from that body, since their present regulations have been acted on. We call upon him to point out a fair exception to this rule. That the College could be compelled to examine any candidates, having complied with the precepts of the charter, we distinctly stated; but what pupil would be so silly as to go to law

with the devil and the court held in hell? We certainly should not like to be the person subjected to the mercy of any body of men compelled to do justice by the double excitement of law and self-interest. This is the feeling which prevails in Dublin, and, as long as it exists, the College will be troubled with few such applications. Let it be only once rumoured that the Court of Examiners in London have expressed a dislike to examine any apprentices except those of their own body, and what Patlander, with all his native courage, will have the hardihood to provoke the surgical knights of the English school to a professional combat? But omitting these and other proofs that the usage of the Irish College is not what Mr. Macartney has represented it to be, has he ever read the by-laws of that College? Do not these laws on the subject of registry, apprentice fees, and the examinations of candidates for "letters testimonial," all exclusively refer to the apprentices of the members and licentiates of this College, and contain in them the germs of monopoly? Knowing this to be the case, as Mr. Macartney must, was it worthy of a man of his integrity to attempt the subversion of a statement which had truth for its basis, and the vindication of his own rights for its object? It is impossible for us to dwell upon his observations without the manifestation of indignant surprise. That man whom we have heard maligned without a cause by the old,—whose name the professional striplings of Dublin have learned from their masters to lisp with contempt,—he it is, that in the agonies of morbid sensibility, now turns round to inform us that he has been well treated by the College of Surgeons.

Had we been the servile flatterers of Mr. Macartney, as he insinuates we have been, how disappointed should we feel in seeing the idol of our admiration sink into the writer of such absurdities. We have dealt with him as we have with others, according to his deserts, and to the best of our judgment; this has been the rule of our past as it shall be of our future conduct, for there are more "sketches" to see the light. It required less sagacity than we supposed Mr. Macartney was possessed of, to perceive that the trade of flattery, with an anonymous writer determined on obscurity, would be but an indifferent speculation. In what would the *cui bono* of such conduct consist; in what breast would the springs of gratitude, starting into existence at the magic sound of our praise, find a receptacle? Is it in that of the shadow of a name as Erinensis, or any other unsubstantial combination of the letters of the alphabet? Such conduct would not be less unmeaning than the lending out of capital where there is no owner to claim the interest, or cultivating the earth where there is none to enjoy the fruits.

Vanity is a harlequin which delights in a diversity of costume, and often assumes the most contradictory characters. We are therefore little surprised at finding it playing off its Proteus pranks under the garb of affected modesty and rejected applause. It is pretty evident, however, that its votary, in the present instance, does not think himself overrated from the singular mode which he has adopted of rewarding his panegyrist. The heart that cannot be softened by flattery, may well be supposed to be callous to censure. Having disdained well-meant and deserved praise, we trust Mr. Macartney will be equally insensible to any remarks which necessity has compelled us to make in this vindication. With respect to the other inaccuracies, which he charges to our account, they are of a nature more calculated to excite a smile than our displeasure; he may rest satisfied of our sincerity, when we assure him that we are rejoiced to find that disappointment has not made him irritable; that years, nearly amounting to the scriptural age of man—"three score and ten," have found him possessed of all the fire and buoyancy of youth; that he refuses more fees than we foolishly imagined he received; and what still gives us greater pleasure, that he intends to demonstrate his claims to practical surgery in his forthcoming publication. To conclude—that he may be happy, his life long, his purse heavy, and his surgical reputation immortal, is the first wish of his ardent admirer,

And your humble servant,

ERINENSIS.

ANOTHER SUCCESSFUL CASE OF TRANSFUSION.

On Wednesday evening last, at the close of Dr. Blundell's Introductory Lecture, (which we shall publish on another occasion,) that gentleman communicated, to a numerous class, another successful case of transfusion of blood into the veins. A woman had lost a large quantity of blood after labour; her life was in imminent danger; and, in fact, from all the symptoms, there was no

probability that she could live more than three or four hours. Mr Doubleday, of the Blackfriars'-road, who attended her, having read in The Lancet of the operation of transfusion which Dr. Blundell lately performed with success, determined to make a trial of it. He accordingly took a quantity of blood from the arm of her husband, (who was willing to make this atonement,) and having made an opening into the median vein of the right arm, proceeded to inject the blood with a syringe, in the manner described by Dr. Blundell in the late experiment.

The operation was performed without the least difficulty; and as soon as three charges of the syringe, or six ounces of blood, had been injected, the woman, who was a native of the sister kingdom, exclaimed, "By Jasus! I feel as strong as a bull." The syringe was replenished several times, and, upon the whole, fourteen ounces of blood were injected. Mr. Doubleday then very judiciously discontinued the injection, as the patient began to experience a slight pain in the head. The woman shortly after declared that she felt herself well enough to get up and walk. Not one bad symptom has supervened since the operation.

To the Editor of The Lancet.

Sir,—I cannot omit my expression of thanks for the very great advantages I have derived from the exposure of that horrible system, a short time since in vogue at St. Bartholomew's, I mean that of taking out the parts whole and entire in every interesting *post-mortem* examination, and conveying them to the Museum, for the purpose of *preparation-making*, without any one knowing more about them, except the mechanical gentlemen so employed. The mighty mover of this quick translation from the dead-house to the Museum, touched by the propriety of A Pupil's advice, or concerned for his own interest, or fearing a second castigation, has directed that whenever any thing particularly interesting occurs, the parts removed shall be *publicly* examined in the Museum on the following day, soon after two o'clock. This change took place the week following the insertion of the first letter of "A Pupil," and a fractured neck of the thigh bone was the first public inspection after the reformation. It is disgusting to think that this salutary letter was scoffed at in the most abusive language by a blear-eyed churl, whose natural perception has been injured by a too strict personal attention to syphilitic iritis.

In conclusion, Sir, allow me to say, that if the pupils of St. Bartholomew's had derived no other advantage from your useful publication than the one in question, you would still be entitled to their warmest gratitude, and I doubt not that when the older ones return, they will view with surprise the beneficial alterations that have taken place in the bigoted habits of this ancient establishment.

Yours, &c.

Tutissimus Medius.

St. Bartholomew's Hospital,
Sept. 15, 1825.

ERRATA AND OMISSIONS

In our last Number.

Bartholomew's Hospital, at page 19, 2d column, 32d and 38th lines from the top, for "*ten* o'clock," read "*one* o'clock." Dr. Conquest's Lectures on Midwifery are delivered at this Hospital.

General Dispensary, Aldersgate-street, page 21, 1st column, five lines from the top, for "*5l. 5s.*" *read* "*6l. 6s.*" and perpetual to both courses (*i. e.* of Materia Medica, Chemistry, &c.,) and Theory and Practice of Physic, *10l. 10s.*; admission to the Dispensary for *nine* months, *7l. 7s.*, instead of for "*three* months, *5l. 5s.*"

London Hospital, page 25, for "180 beds," *read* "280." Lectures on Materia Medica and the Institutes of Medicine, are delivered by Dr. Billing.

Admission to Mr. Lawrence's Lectures on the Eye, for "One Course, *2l. 2s.*" *read* "*3l. 3s.*"

The Prospectus of Dr. Greening's Lectures came too late for insertion.

Dr. Power, Lecturer on Midwifery, has removed to No. 6, Leicester-place, Leicester-square.